THE DOCK & HARBOUR AUTHORITY

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Editorial.

The Port of Leghorn.

The Italian Government have in recent years been granting loans to a considerable number of Italian ports for the purpose of developing the facilities which are at present available so as to attract increasing trade to the Italian ports, with resultant benefit to the country in general.

The Port of Leghorn, which is situated on the west coast of Italy in the Ligurian Sea, forms the subject of this month's supplement, and is one of the ports which have recently been granted a loan for the purpose of carrying out certain works for the enlargement of the port. Amongst these new works is the laying down of a special oil port, the construction of 1,800 metres of new quayage with a depth of water of 9 metres, and 1,300 metres of new quayage with a depth of water of 4 metres.

These new quays, when completed, will be provided with 4 warehouses with an area of 3,000 square metres and electric cranes of 1.5 and 3 tons capacity.

The traffic in the port has shown a considerable increase over the pre-war figures chiefly in imports.

Constructional work in the port on a large scale has not been carried out since 1909, when a new breakwater was constructed and a new quay, but to-day it is found that these facilities are inadequate for the amount of traffic the port is handling, and when the works, which are now in hand, are completed, the port will undoubtedly attract even more trade than it does to-day.

An illustrated article on the Port of Leghorn and its development appears on another page.

Douglas Harbour Works.

The Isle of Man Tynwald has authorised the expenditure of a sum not exceeding £47,000 for the purpose of enabling the Isle of Man Harbour Commissioners, in consultation with the Lieutenant-Governor, to continue the work of extending the Red Pier, Douglas Harbour. The money is required for dredging and plant. When the proposed work was first contemplated it was intended that the costs should be paid for out of the general revenue. That has not been found possible. Before the contractors can get on with the structural works the dredging has to be completed, and that work can only be done in the summer months. The Harbour Commissioners have made a number of blocks to put in the foundations, but cannot go on making more blocks, because all available space is occupied.

The World's Fastest Ocean Grain Terminal.

The s.s. "Farnworth," which loaded the first commercial shipment of grain via Canada's new Hudson Bay port, sailed from Churchill, Manitoba, on September 18th, carrying 277,000 bushels of No. 2 Northern wheat.

On September 22nd the "Warkworth," the second of the two vessels prepared for the test shipment, cleared from Churchill Harbour carrying 268,000 bushels of grain to an unnamed European destination.

The test shipments, therefore, totalled 545,000 bushels, and with the despatch of these cargoes grain shipping at Churchill ceases until the port comes into regular operation in 1932.

The great new Canadian Government elevator of 2,500,000 bushels capacity remained clear of grain after having performed its initial functions, but it may be called into use later to store about 1,000,000 bushels of grain during the winter. The elevator passed its efficiency tests, and, with its most up-to-date loading conveyors, was declared by its designer to be the world's fastest ocean grain terminal. Coming into operation on September 15th, the exact date set almost a year ago, when the structure was in the preliminary stages of erection, the big elevator functioned smoothly and with perfect precision whilst almost 200,000 bushels of grain poured through the conveyors into the holds of the "Farnworth" before the first day's operation was concluded. The conveyors carried the grain from the elevator, which is set back 600-ft. from the dock, and three spouts, each discharging grain at the rate of 12,000 bushels an hour, were used in loading. More spouts are available, if required, and a rate of 18,000 bushels an hour can be attained.

The Public Works, Roads and Transport Exhibition.

This exhibition, which will undoubtedly prove of considerable interest to our readers, inasmuch as a considerable number of the exhibits are so intimately concerned with dock and harbour developments, will be held at the Royal Agricultural Hall on November 16th to 21st, 1931.

There will be a wonderful display of modern plant and machinery and a detailed list of some of the principal exhibits appears on another page.

Ardrossan Harbour Further Powers Bill.

A Bill promoted by the Ardrossan Harbour Company giving the company power to borrow further monies not exceeding £50,000, in addition to the powers already possessed, received the Royal Assent on October 7th. The additional powers can be exercised by way of loans, debentures or bank credit. It is understood that there is no present intention of making a public issue.

Ship Canal Traffic "Down."

The Manchester Ship Canal Co., in their traffic returns for the month of September, report that receipts were approximately £83,715, which represents a decrease of £6,771 on the corresponding month of last year. The receipts for the nine completed months of this year were £861,003, as against £982,891. In previous years the return for the first six months has furnished a guide in making calculations for the whole year, but this year's is less useful in that connection, owing to the wages reduction only applying to three months' figures. The fall in the Ship Canal revenue up to the end of last June was £90,923, but the net revenue from the whole of the undertaking, after providing for interest and fixed charges, was only £75,335 down.

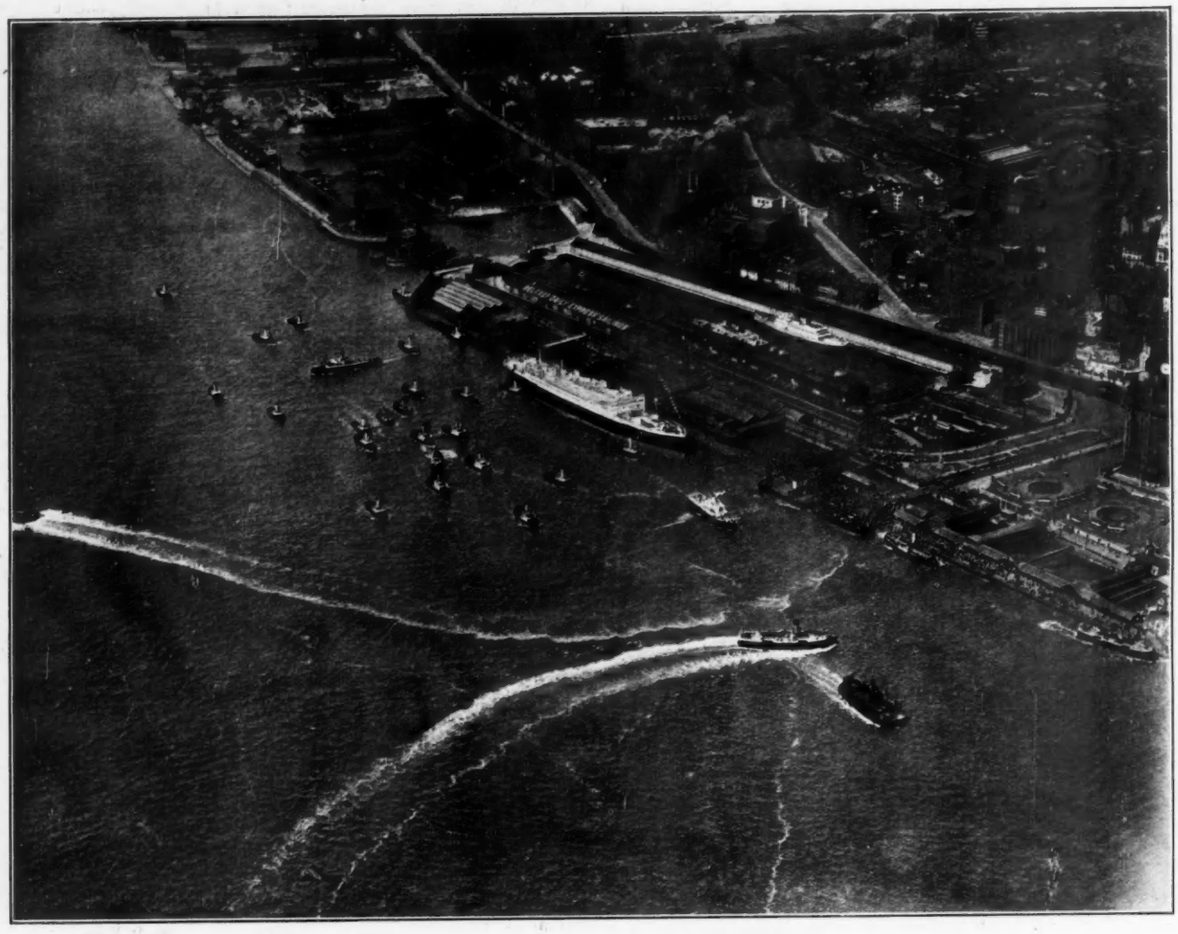
Institute of Marine Engineers.

The Council of the Institute of Marine Engineers desire to remind young engineers and apprentices of the educational advantages afforded by association with the Institute. Apprentices or students intending to become marine engineers are admitted as graduates on furnishing proof of apprenticeship and studentship at a recognised technical school or college.

The Institute's annual examination for student graduateship and the accompanying diploma, open to graduates or others not yet associated with the Institute, will be held on April 4th-7th next at centres arranged to suit candidates. Superintendent engineers of the leading shipping companies recognise that possession of this diploma is proof of all-round ability in the technical subjects specially required as the foundation of a successful career as a marine engineer.

Of particular appeal to ambitious and studious apprentices is the annual offer of the Lloyd's Register Scholarship, value £100 per annum and tenable for three years at an approved university. The next examination for the scholarship will be held on May 9th-10th next, at various centres. Full particulars may be obtained from the Secretary, Institute of Marine Engineers, 85, The Minories, London, E.C.3.

Notes from the North



The Port of Liverpool: Liner at Landing Stage.

New Irlam Wharf.

A LARGE wharf is in course of construction on the bank of the Manchester Ship Canal, contiguous to the works of the Lancashire Steel Corporation, Ltd., at Irlam. The wharf will be 600-ft. long and 200-ft. wide when completed. The contract is being executed by Sir Robert McAlpine and Sons, and it is scarcely likely that the wharf will be ready for use before the expiration of another six months. The wharf juts into the works site with a network of railway lines, constructed on the permanent way principle, running alongside, and branch lines in all directions. A huge basin nearby is likewise in course of construction, 200-ft. square, which will be of sufficient capacity to store 100,000 tons of ore. The wharf is being constructed in six sections, surrounded by joist locking piling. The main concrete wall, now nearing completion, is reinforced with steel. To facilitate the unloading of the ore a steel bridge is being constructed by the Pearson and Knowles Engineering Co., Ltd., of Warrington, one of the allied firms of the Steel Corporation, Ltd. When completed the works will be equal, if not superior, to any steel works in the country, both as regards equipment for economic manufacture and the transport of the finished materials by either rail or water.

Preventing Cracks in Sea Walls.

Mr. W. Melville, borough engineer, Fleetwood, gave an address at the conference of North-Western District of Municipal and County Engineers, on the Fleetwood sea defence works. He said the sea defence works carried out by the Fleetwood Urban Council were three miles in length and varied in character according to the duty imposed. On the west side the works were much more substantial in design and served to secure the hinterland from the flooding at abnormal high tide in a similar manner to the dykes of Holland. The range of tide in Morecambe Bay was very high, and at extraordinary spring varied between 2-ft. below to 30-ft. above zero. This was due to the tidal wave from the South of Ireland meeting that from the North Channel in Lune Deeps, where the phenomenon known as "The Ripplings" could be observed on calm days.

The rapid extension of Fleetwood in recent years made it imperative to construct permanent sea defences to safeguard its further development. The Council set the engineers to build 100 yards of wall each week to have the danger point protected in five months. The complete cost of the work was £60,990.

An interesting point mentioned by Mr. Melville was that a piece of brown paper was inserted between each cement "bag" in the Fleetwood sea defence wall. The brown paper, he explained, allowed each "bag" to contract when struck by a cold wave, and the expedient had been successful in preventing cracks in the wall.

By the sale of gravel which had been washed up on the sea shore at Fleetwood during the last five years a profit of £30,550 had been made by the local Council.

Mr. E. Wilkinson (Wallasey), dealing with coast erosion, said that at Wallasey the erosion was at the rate of one yard a year, and if the Wallasey Corporation had not built a sea wall the town would now have been in the sea. They had enclosed 100 acres of land from the sea, and by this means they were hoping to get back part of the cost of the promenade. They had considerable difficulty in obtaining a design for a sea wall to resist the pressure of the sea, and they had to use reinforced concrete piles. The use of groynes was out of the question, as owing to the length they would have to be to reach low water they would have cost £1,000 each.

Mr. D. Fothergill commented upon the transformation that has been effected on the beach at Fleetwood, and declared that the reason why gravel was washed up at Fleetwood in such great quantities was that there was erosion of the cliffs at Norbreck, Blackpool.

Mersey Tunnelling Triumph.

Mr. B. H. M. Hewett, M.Inst.C.E., engineer in charge of the new Mersey Tunnel, at a meeting at Heswall, explained the principles of the survey work and the amazing accuracy with which it was carried out, observing that when the two sections of the tunnel were joined up under the bed of the river they were less than an inch out in either depth or distance. Information was given of the scheme which will ensure an abundance of pure air in the tunnel, and of the way in which the foul air and noxious fumes will be eliminated.

Notes from the North— continued

Ribble Works Postponed.

The Ribble Committee of the Preston Corporation propose to postpone until next year work on the training walls, which appeared in the estimates at £10,725, and the Naze wall, £3,750. It is not generally known that Preston Docks are the nearest seaway to three millions of people. The sea-going entrance to the Ribble Channel is marked by the Nelson Buoy, which is 16½ nautical miles from the dock gates. The Preston Corporation maintains a 14-mile channel, marked by over 40 navigation aids, and a staff of pilots and dredging is going on almost ceaselessly.

Cleveley Sea Defences.

Thornton Cleveleys Council has received sanction from the Ministry of Health to borrow £15,600 for sea defence works at Cleveleys.

Huskisson Dock Incident.

In somewhat mysterious circumstances a flat owned by the Grain Elevating and Automatic Weighing Co., Ltd., of Liverpool, and fitted with a grain weighing machine, unaccountably sank recently in the Huskisson Branch Dock, No. 3, Liverpool. Nobody was aboard, and no lives were endangered. The flat was raised the following day and is now in service again.

Wallasey Bridges.

The Ministry of Transport have declined to make a grant towards the cost of making up the approach roads to the Wallasey Pool Bridge in the event of arrangements being entered into by the Wallasey Corporation, the Birkenhead Corporation and the Mersey Docks and Harbour Board to free the bridge of tolls. This decision will doubtless end the efforts of the Corporations concerned to get the bridge toll-free, as it is unlikely that the burden could be accepted by either Wallasey or Birkenhead. The cost of the road work alone would be about £13,000, to which must be added compensation to the Dock Board for loss of tolls.

Expert Opinion Against Bridge Scheme.

Consulting engineers have reported against the scheme submitted to them by the Flintshire County Council for bridging the mouth of the River Dee. The proposal put forward by Councillor H. H. Nuttall, of Liverpool, is condemned as likely to be excessive in cost and a menace to navigation. It is understood the report is also adverse to any plan involving a bridge at the river's mouth. This does not necessarily mean that a bridge elsewhere is an impossible eventuality. Mr. Nuttall's scheme was estimated to cost £6,000,000, returnable by tolls, and to provide work for 3,000 men. He would have had the Dee Channel crossed by a bridge with twenty 240-ft. spans.

The Flintshire County Council are believed to have other plans in mind, but these have not yet been openly discussed.

Pile Driving Complaints.

Pile driving operations on the Wallasey foreshore, in connection with the promenade extensions scheme, have resulted in a number of complaints being lodged with the Corporation. These have crystallised in a suggestion that the contractors should be asked to reduce the hours during which pile-driving takes place, to prevent the great nuisance caused by clouds of black dust arising from the bad conditions of Portland Street and the emptying of waggons of debris. The chairman of Wallasey Corporation Works Committee, points out that during September the contractors limited the hours of pile-driving to between 7 a.m. and 10 p.m., instead of 6.30 a.m. to 11 p.m. as previously. The contractors, however, had now claimed considerable payment for this loss of time, and any additional curtailment would entail a large expenditure.

Isle of Man Harbour Maintenance.

The Isle of Man Tynwald has approved the estimates submitted by the Harbour Commissioners for the maintenance of the harbours of this island (including the Victoria Pier Buildings and Swing Bridge, Douglas; and the Queen's Pier, Ramsey) for the year ending March 31st, 1932, amounting in the aggregate to £21,777.

Manchester Grain Elevators.

Grain Elevator Estate, Ltd., and Port of Manchester Warehouses, Ltd., who have their headquarters in Trafford Park, Manchester, have just issued their annual report for the year ended June 30th. Grain Elevator, Ltd., has held land since 1899 at a rental from Trafford Park Estates, Ltd., with a view to re-sales. The profit shown by the present accounts is £8,100, as against £8,556 in 1929-30. After paying a dividend of 16⅔ per cent., there is £376 to carry forward, as against £672 brought in. For 1928-9 the company paid 25 per cent.

The Port of Manchester Warehouses Company has been less successful financially. Its net profit in the financial year now reported upon was £5,910, and £3,085 was brought forward, less £250 put to the reserve, £637 for debenture redemption, and a premium of £30 on redeemed debentures. The net profit in 1929-30, after providing for depreciation, etc., was £5,213, and the available balance, after deducting from the sum brought forward, £242 put to the reserve, and £667 for debenture redemption, was £7,376.

Loading Lightships at Liverpool.

Rangoon Harbour Commissioners are in process of accepting delivery of three fully equipped lightships, built at the River Dee shipyards of Messrs. J. Crichton and Co., Saltney. Each weighs 140 tons and is 70-ft. long and 27-ft. wide, and was raised to the deck of the m.s. " Belnor " from the water in the Gladstone Dock, Liverpool (to which they were towed from Saltney), by the cranes of the motor vessel. Each craft has a focal plane 45-ft. above water line, and an illuminating capacity of 1,750 candle-power, having a flash of three-quarters of a second and an eclipse period of two seconds. There are also riding lights fore and aft, the lanterns being fitted with 10-litre burners set to give 40 flashes per minute. The main light, the riding lights, fore and aft, and the fog bell, all operate automatically for one year without attention. The light and fog bell are under sunvalve control, sensitive even to the passing of a heavy cloud. In addition to this automatic equipment, there is an ordinary type 10-cwt. bell gong mounted on deck. The three lightships are constructed of Armco iron plates for the special purpose of resisting corrosion, which is such a serious problem in certain waters. All the light and fog bell mechanism has been supplied and fitted by the Gas Accumulator Co. (United Kingdom), Ltd., of London. The lightships were lifted to the deck of the " Belnor," in completed order, ready for launching overboard at the actual stations in foreign waters.

Getting the lightships on board the " Belnor " was a lifting operation which was witnessed by a large number of people who assembled at Gladstone Dock for the purpose. First of all the vessels had to be slung at an angle of several degrees from the perpendicular to enable the light tower to clear the lifting beam, the height of the tower being greater than the length of the lifting slings. The procedure adopted was to lift the load from the water, place it athwartships upon specially prepared timbering on top of the main hatch under the jib of the crane, and then slide the light vessel forward along the timbers, which up to a point resembled launching ways, with the difference, of course, that here the vessel was made fast in position in a timber cradle with a list of about 7½ degrees, and with an overhang of 12-ft. on each side of the " Belnor."

It is not long since Messrs. Crichton shipped another lightship from Liverpool, for service at Shatt-Al-Arab, in the Persian Gulf. Besides the three lightships, the " Belnor " has on board a number of big locomotives for Rangoon.

Douglas Dredging Complaint.

The Isle of Man Harbour Commissioners recently defended a lawsuit brought by the proprietress of the Fort Anne Hotel, Douglas, who sought an injunction restraining them from dredging in the harbour below the hotel in such a way as to cause a nuisance to residents and guests. The dredgnig is part of a scheme for extending the inner pier so as to provide additional landing accommodation for holiday-makers. In the summer of 1930 the Harbour Commissioners, in response to complaints alleging intolerable noise, stopped dredging at night, but this winter the work is proceeding on nights when the state of the tide is suitable, and on Sundays.

New Merseyside Dock.

Since the work of building a new dock on the site of the old Wallasey Pool was started about a year ago, considerable headway has been made in this £900,000 scheme which the Dock Board is undertaking for the development of the Birkenhead dock system. Gradually the concrete quaysides are being built up to enclose what will eventually be an area of water almost as large, apparently, as the West Float itself. The Pool was an almost derelict sheet of water. When the work now in progress is completed the largest vessels which now enter the Birkenhead docks will be able to berth at the new quays, and extensive areas will be provided for the erection of warehouses.

Manchester's Growing Imports.

Cotton imports to Manchester are more than holding their own in spite of general world depression. Already this season's imports have exceeded those in the corresponding period of last season. Among the growths imported the principal are American, Egyptian and Indian; other growths coming direct to the port include Peruvian, Argentine, African. As the season progresses other growths, including Sudan, Russian, etc., will be added.

Last season the total number of bales of all growths was 676,966, over 40,000 bales more than the imports for the season 1929-30. The direct imports are relatively good considering the state of trade and the greatly reduced imports to Great Britain.

Notes from the North—continued

Federation of Mersey Ports.

Suggesting that the creation of the new Mersey Tunnel would forge a strong link in the federation of the Mersey boroughs, Sir Thomas White, at the October meeting of the Mersey Tunnel Joint Committee, said he did not suppose members of the Council who were not on the committee had any conception of what the committee were attempting to carry out. Having regard to the nature of the work, the unanimity of the committee was extraordinary, and the work, hard as it was, was very greatly lessened by the spirit of helpfulness which existed on both sides of the river—a spirit which, he felt, would continue. So much did he deprecate any spirit of rivalry that, if there were an opportunity, he would be one of those who would move rapidly in the direction of a federation of both sides of the river. He did not see any difference of opinion or principle dominating either one side or the other. They were members of the Port of Liverpool, and the very fact they were working there for the purpose of physically joining both sides of the river seemed to offer the greatest argument why an administrative joining should take place early.

Mersey Pilotage.

Compared with the average gross earnings of pilots attached to the Port of London of £1,327 and net earnings £1,026, it may be interesting to mention that at Liverpool the 116 first-class pilots average £592 gross and £517 net, and 20 second-class pilots averaged £493 and £430, in addition to pay for extra services.

Grain Elevator Plant.

There is general satisfaction in Manchester at the unconfirmed news that Messrs. Henry Simon, Ltd., of Cheadle Heath, have obtained an order from the Jutland Co-operative Feeding Stuff Society for a large grain elevator plant for Esbjerg. This order has been placed with an English firm, notwithstanding lower German tenders, and is said to have been given for the purpose of demonstrating that Danish farmers are willing to give England a preference.

Concessions to Importers.

Mersey Docks and Harbour Board have added a recommendation of the Traffic Committee that the following reduced master porters' rates on cocoa and cocoa husks in bags be made operative: Cocoa and cocoa husks in bags not exceeding 7 cwts. per draft of five bags, 54d. per ton delivery after having been stowed on the quays. Exceeding 7 cwts. per draft of five bags, 50d. per ton delivery after having been stowed on the quays.

The rates proposed mean a reduction of 8½d. per ton on the heavier bags and 4½d. per ton on the lighter bags.

New Industries Wanted.

Liverpool Organisation for the Advancement of Trade has completed a huge propaganda scheme outlining the immense facilities offered by Merseyside for erecting factories, and a favourable opportunity for its launching is awaited.

Quick Turn-round at the Port of Manchester.

Last week the s.s. "Lilburn," with a cargo of 2,289 tons of iron pyrites from San Juan, was discharged at Irwell Park Wharf in 11 hours. Four cranes worked from 8 a.m. until 5 p.m. the first day and four cranes the following day from 8 a.m. to 11 a.m.—a total of 44 crane hours, making an average discharge at the rate of 52 tons per grab crane per hour. The owners—Messrs. Smith, Hogg and Co., of West Hartlepool—through their Manchester agents, have congratulated the Port Authority on this "excellent despatch and splendid turn-round."

Aden Port Trust.

The returns for the month of July, 1931, of shipping using the port were as follows:—

	No.	Tonnage
Merchant Vessels over 200 tons ...	119	467,724
,, ,, under 200 tons ...	4	648
Government Vessels	8	7,751
Dhows	35	831
PERIM.		
Merchant Vessels over 200 tons ...	20	61,589

The number of merchant vessels over 200 tons that used the port in July, 1931, was 119, as compared with 134 in the corresponding month last year, and the total tonnage was 468,000, as compared with 511,000.

Excluding coal, salt, fuel oil and Military and Naval stores and transhipment cargo, the total tonnage of imports in the month was 6,600, and of exports 4,200, as compared with 6,400 and 3,700 respectively for the corresponding month last year.

The total value of imports excluding Government stores was Rs.39,45,000, as compared with Rs.41,68,000 for July, 1930, and of exports Rs.26,16,000, as compared with Rs.32,07,000.

The total value of both imports and exports together was Rs.65,61,000, as compared with Rs.73,75,000.

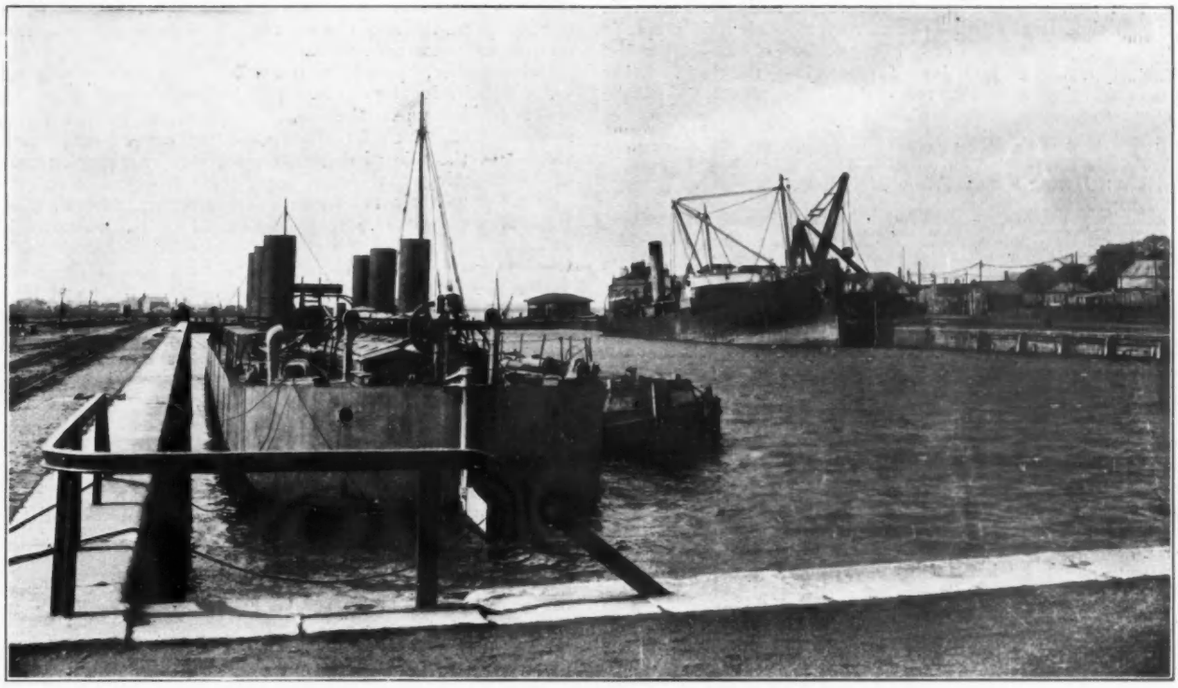
Imports during the month were above those for July, 1930, in the case of coffee, grain, pulse and flour, hides (raw), seeds, sugar, piece goods (printed or dyed), and tobacco (manufactured); and below in the case of gums and resins, hardware, skins (raw), piece goods (white), twist and yarn, tobacco (manufactured), and treasure (private).

Exports were above those for July, 1930, in the case of coffee, grain, pulse and flour, seeds, piece goods (grey), piece goods (printed or dyed), and tobacco (unmanufactured); and below in the case of gums and resins, hardware, hides (raw), skins (raw), sugar, piece goods (white), twist and yarn, tobacco (manufactured), and treasure (private).

TRADE OF THE PORT.

Article.	Unit.	Imports.		Exports.	
		Quantity.	Value Rs.	Quantity.	Value Rs.
Coal	Tons	7,307	1,93,168	0	0
Coffee	Cwts.	8,649	2,91,635	6,254	2,85,863
Grain, Pulse and Flour ...	,,	33,673	1,79,031	13,353	75,447
Gums and Resins	,,	517	8,569	1,259	26,734
Hardware	—	0	7,546	0	5,152
Hides, raw	No.	5,682	8,528	2,630	4,300
Oil, Fuel	Tons	25,463	7,61,040	0	0
,, Kerosene	Gls.	16,000	11,500	1,984	2,023
,, Petrol	,,	8,000	10,000	1,320	1,630
Salt	Tons	0	0	28,000	3,07,900
Seeds	Cwts.	3,117	30,467	778	7,718
Skins, raw	No.	292,800	1,37,474	297,294	2,33,725
Sugar	Cwts.	10,606	69,439	7,837	53,912
Textiles—					
Piece Goods, Grey	Yds.	3,939,680	6,29,669	3,521,650	5,01,604
,, ,, White	,,	341,637	71,726	175,450	43,798
,, ,, Printed or Dyed ...	,,	578,226	1,20,161	681,028	1,81,637
Twist and Yarn	Lbs.	116,404	50,720	81,198	41,675
Tobacco, Unmanufactured	,,	813,864	1,66,130	822,752	1,54,045
,, Manufactured	,,	48,004	53,378	25,508	26,144
Other Articles	No. of Pkges.	54,873	8,42,990	16,354	3,80,791
Treasure, Private	—	0	2,98,868	0	2,81,502
Total ...	—	—	39,45,039	—	26,15,600

Scottish Harbour Notes



The London and North-Eastern Railway Company's Alloa Dock.

Clyde Trustees and Relief from Local Rates.

AT a recently-held meeting of the Clyde Trustees it was intimated that the relief to the Trustees from local rates for the year from Whit Sunday, 1931, to Whit Sunday, 1932, was estimated at £84,000. It was accordingly recommended that during the year from October, 1931, to September, 1932, the present percentage rebates be renewed on the footing that the derating relief continues for the assessable year from Whit Sunday, 1932. It was estimated, however, that the rebates granted would—for a year—result in a total relief of £89,769. The rebates in respect of coastwise goods—thirty per cent.—were intended to help the coasting trade to effect a reduction in their charges—with a view to increasing seaborne traffic.

River Forth and Navigation Improvements.

Although the Forth Conservancy Board were expected to spend a sum of £2,650 on deepening or otherwise improving the River Forth from a navigation point of view between Stirling and Alloa within five years after coming into existence little had been done in the matter so far. Extensions of the time limit have been granted and the Board have now proposed to Stirling Town Council that provision should be made in the amending order to their Act of 1921 (which they purpose promoting) that, as they are the body entrusted with the making of the navigable channel, it should be left to their discretion to decide when the balance of the £2,650 should be expended along with any other sums considered necessary. The attitude hitherto adopted by the Board was that—looking to the state of seaborne trade to Stirling—it would not be wise to spend the sum provided for in the Act until trade improved.

In the above connection it is interesting to note that at a recent meeting of Stirling Town Council, Judge Moores expressed the opinion that some action should be taken by the Council to ensure that the river would not be silted up and the harbour lost. Strangers to the town (he felt) might be pardoned for thinking that the place was becoming derelict from the appearance of the harbour. He added that there was no occasion for panic on the score of the river silting up and there was no evidence of that. The Provost's Committee were asked to report on the Board's proposal at their next meeting.

Annual Meeting of Leith Dock Ratepayers' Association.

When there took place recently the annual meeting of Leith Dock Ratepayers' Association, interesting and important statements were made by Mr. J. A. Lindsay and Mr. Hugh Rose as the retiring representatives of the ratepayers. In the course of his observations, Mr. Lindsay said the contracts had now been placed for the foundations of the new grain warehouse at the Imperial Dock, and the driving of piles was proceeding. The warehouse would have a storage capacity of 20,000 tons. He also mentioned that the coal shipments during the past two months averaged 30,000 tons per week as compared with 40,000 tons per week in the busiest years (1913-1923).

In his general statement at this meeting of the Leith Dock Ratepayers' Association, Mr. Rose emphasised the strong financial position of the Commission. They had a surplus revenue of £16,000—which was very satisfactory considering trade conditions—and it was absolutely necessary that such a balance should be maintained, if not increased. The debt was over £1,000,000 and the interest on the borrowed money amounted last year to £44,000 while the statutory sinking fund amounted to £26,000, making the item for expenditure on interest and sinking fund about £70,000. Under derating the relief granted amounted to £10,500, which has been handed over in the proportion, roughly, of seventy-six per cent. to the coal trade, and twenty-four per cent. to the coasting and export trade.

Development of Ayr Harbour.

By an Act of 1919 it was provided that the Railway Company would work and develop Ayr Harbour and give all encouragement to existing and future traffic, and that they should (not later than the expiry of ten years from the war) expend on the improvement of the dock and its precincts a sum of not less than £50,000. Before last year between £2,000 and £3,000 had been spent under these statutory obligations, and a further development of that policy is seen in the work which is at present being carried out at the dock, although a visit gives only a conservative idea of the extent of the changes for the better which are taking place, the cost of which will (it is expected) exceed the original sum stipulated. Four electric cranes (to replace the hydraulic apparatus formerly used) have already been installed on the west side of the dock. These are used for discharging and unloading general cargo and are of the latest type; three of them capable of lifting a load of three tons at a speed of two hundred feet a minute and one an additional two tons at the same speed.

In this Ayr Harbour scheme the greatest development and improvement, however, is in the installation of a coal conveyor of the latest type. This conveyor (it is understood) will be fitted with anti-breaking appliances and will be capable of dealing with at least 500 tons of coal per hour. This is an improvement over the old steam crane method of some 300 tons per hour. The new apparatus, which is similar but embodies recent improvements to the electric conveyor erected at General Terminus, Glasgow—works on the endless belt principle. A loaded waggon is wheeled into the structure and is then weighed and lifted to the top, tippled, and the coal transferred to a hopper. The coal then passes on to a belt

Scottish Harbour Notes—continued

which carries it in a shute down into the vessel below. The empty waggon is lowered and weighed again, and another full one takes its place. There is thus almost a constant stream of coal into the hold of the vessel and a considerable saving in time is affected. The conveyor which it is proposed to erect at present is fixed, but another of a similar but movable type will be built later further along the dock. Other improvements include the removal of the present hydraulic capstans to be replaced by electric ones and the provision of extra rail accommodation.

Anstruther Harbour and Trade Depression.

Anstruther Harbour and Trade Depression was the subject of an interesting article that recently appeared in a Fifeshire newspaper. It was observed that time was when the port of Anstruther was a hive of industry for as many months in the year that it now has busy weeks and when money was plentifully circulated in the town and district as a consequence of home port landings. Had the time not arrived (asked the writer) when an endeavour should be made to bring back a measure of the old-time activity of Anstruther Harbour by a re-introduction of local fishing? In spite of the enterprise and courage of the East of Fife fishermen, the fact remained that the present mode of fishing was not a profitable proposition, and that the majority of crews were finding it increasingly difficult to make ends meet.

"Anstruther," proceeded the writer, "is in every way suited for a healthy local market. It's harbour is one of the most prominent havens on the East Coast. Other ports with fewer facilities and which have also been in danger of becoming victims of the tide of depression are concentrating on a form of local fishing that is bringing work to their district and prosperity to their town, while most of the fishermen in the East of Fife continue to go far afield to pursue operations. One suggestion is that the local Town Council and Harbour Commissioners should convene a meeting with leading fishermen and fish buyers to obtain the views of practical men of the industry. As things stand at present there is little prospect of attracting new industries to the town. The re-introduction of a white fish market might prove to be the way out of the depression for all concerned."

Notes from Far Eastern Ports

Ceylon

Port of Colombo's Foreign Trade.

IMPORTS to Ceylon during September, through the port of Colombo, were reduced to a new low level and there is in the trade accounts some approximation to an equilibrium between imports and exports. The value of Ceylon produce exported remains at the level for the preceding month (August) valued at Rs.14,726,712. Imports, on the other hand, have dropped by five millions to Rs.15,117,464. Of the imports, commodities valued at Rs.1,757,710 were re-exported, so that the value of the imports retained for home consumption is Rs.13,359,754, arrived at:—

	Rs.
Imports	15,117,464
Less Re-exports ...	1,757,710
	13,359,754

The situation, therefore, may be regarded as satisfactory, as the exports of Ceylon produce have exceeded imports intended for use within Ceylon.

A comparison of the imports in September with those during the previous month disclosed the fact that the reduction of five million rupees already referred to is mainly borne by luxury goods. In the month under review only 400 gallons of kerosene oil were imported as compared with 948,545 gallons in the previous month. There was also no importation of motor spirit, as 1,592,303 gallons were imported in the previous month. Crude petroleum imported in September amounted to 1,705,204 gallons as against 3,353,776 gallons in the previous month. The imports of cigarettes was almost halved, but the quantity entered for home consumption during the month under review was 800 lbs. in excess of the figure for August.

It is interesting to note in this connection that the quantity of rice imported has increased from 806,354 cwt. to 821,302 cwt., of unrefined sugar from 1,423 cwt. to 2,930 cwt. Maldive fish imports, on the contrary, have dropped from 9,252 cwt. to 6,034 cwt., representing a saving of Rs.253,480.

The quantities and values of the principal exports for September are as follows:—

Tea 16,334,295 lbs. (14,029 lbs. being of green tea), valued at Rs.9,882,222. Rubber, 8,360,644 lbs. valued at Rs.982,370. Coconut Oil, 80,236 cwt. valued at Rs.867,448. Desiccated Coconut, 50,431 cwt. valued at Rs.398,910. Copra, 217,331 cwt. valued at Rs.1,288,785.

Colombo Harbour Dredging.

During the month of August the dredger "Sir William Matthews," was engaged in dredging berth No. 9, N.E., and berth No. N2, N.W., for the replacement of mooring 51. The total quantity of cubic yards of dredged material that was removed and deposited at sea during the month was 20,150. Minor repairs to the dredger were also carried out during the latter part of the month.

Madras

Cochin Harbour.

The Inter-State Conference on the further stage of development of the Cochin Harbour was held recently at the Secretariat, Fort St. George, the Hon. Sir M. Krishnan Nair, Law Member of the Government of Madras, presiding. Representatives of Madras, Cochin and Travancore Governments numbering 22 in all were present.

The object of the Conference was to discuss and settle details as to the further and final stage of the harbour development.

The first days proceedings of the Conference were confined to the works to be executed. They comprised extension of railways, building of wharfs and other equipment necessary for a port of first-class importance. These works are estimated to cost approximately Rs.150 lakhs; and the questions also were for consideration whether the anticipated trade development would justify such a heavy financial commitment and what should be the proportion in which this outlay should be shared as between the three Governments. The idea is to complete the harbour within three to five years. It may be stated in this connection that nearly ninety lakhs have been already spent on the harbour.

The Conference was continued for four days and during the sittings, the limits of the port of Cochin, formation of a port trust when the port is fully developed, criminal and civil jurisdiction and other connected matters were fully discussed.

Siam

Heavy Drop in Business at the Port of Bangkok.

The sharp decline of exports and imports for the Port of Bangkok during the last year are revealed in detail in figures released by the Customs Department. The total decline in imports for the year are Tcs.41,130,905 and the decline in exports total Tcs.43,725,764. For the year closing on April 1st, the import of general merchandise totalled Tcs.124,133,990, while for the previous year they amounted to Tcs.138,336,132. The imports of wine, beer and spirits showed a similar decline. For the closing year they amounted to Tcs.2,801,712 and for the previous year they were Tcs.3,108,899. During the year there was imported Tcs. 1,284,000 worth of gold leaf, while during the previous year the import amounted to Tcs.3,565,000. The import of bullion and coin remained the nearest stationary. During the last year the imports amounted to Tcs.4,264,363 and for the preceding year they totalled Tcs. 4,384,851. All of these imports, along with those of the Government, brought the total for this year to Tcs.139,707,755, while that of last year was Tcs.180,838,660.

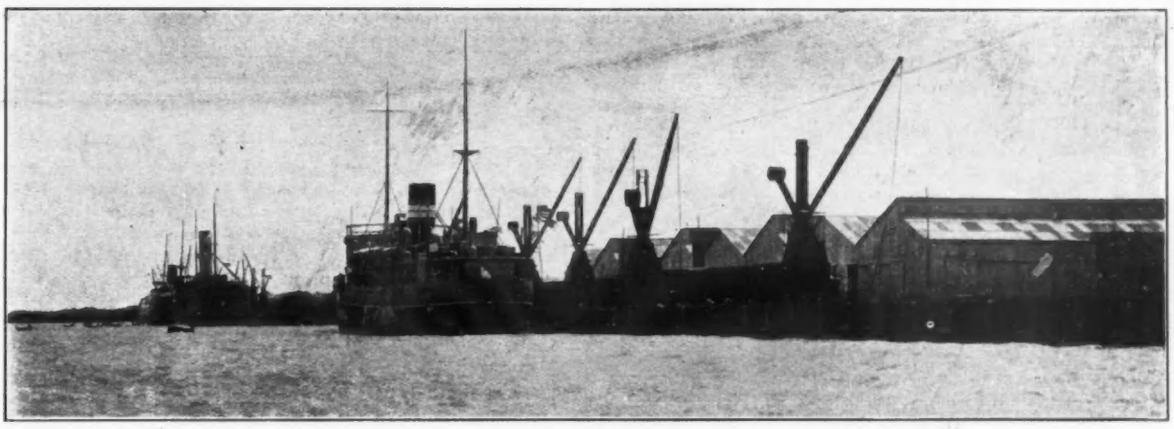
The export figures tell a similar story. Rice sent out of Siam during the year under review was valued at Tcs.103,047,352, while the export of the preceding year amounted to Tcs.137,436,421. The export of teak for the closing year was Tcs.10,056,019 and for the year before totalled Tcs.11,218,773. Other goods exported from the Kingdom during the last year amounted to Tcs.21,917,415 and the total for the previous year was Tcs.30,066,961. These exports along with some rubber brought the total for the year to Tcs.135,037,266, while for the previous year they were Tcs.178,763,030.

Memorial Bridge.

Besides the amount contracted for the building of the famous memorial bridge in Siam, Tcs.4,800,000, Messrs. Dorman Long and Co., Ltd., are to receive a compensation of Tcs.36,000 from the Siamese Government for completing the work before the time stated in the agreement.

The contractors' part of the work is practically finished and the whole construction is expected to be completed by next month, after which the Bangkok Dock Company, Ltd., and Department of Municipal Affairs will take charge of the

Notes from Far Eastern Ports—continued.



Rangoon Mail alongside the Jetties at Chittagong.

building of landings, roads, gardens and the other works on both sides of the bridge.

Shipping at the Port of Bangkok.

The number of foreign vessels which called at the port of Bangkok during the month of August were as follows:—

Total gross tonnage, 56,295, including 18 British, 19,475 tons; 26 Norwegian, 21,671 tons; 2 Japanese, 3,526 tons; 1 French, 692 tons; 5 Dutch, 5,672 tons; and 3 Danish, 6,149 tons.

Bombay Port Trust.

At a meeting of the Trustees of the Port of Bombay held on September 25th, 1931, the draft Administration Report for the year 1930-31 was considered and approved.

The Board considered a resolution moved by the representatives of the Indian Merchants' Chamber to the effect that the list of fire insurance companies approved by the Trustees for the purpose of insurance of lessees' buildings under the conditions of the lease should be revised and all companies not incorporated in India should be deleted from the list. After full consideration the following amendment was adopted by a majority:—

> The Trustees are of opinion that the proposed restriction of their list of approved insurance companies would not be in the interests of the Port Trust or its lessees.

On a representation from certain tenants at Grain Depot the Trustees decided to classify oil cake in the same category as oil seeds and to reduce the storage charge from Rs.6 to Rs.4.80 per sq. yd. per annum.

A lease of 15 years of approximately 7,230 sq. yds. of land at Sewri and of go-downs thereon, formerly occupied by the White Kerosene and Mineral Oil Company, was granted to Messrs. Beniprasad Kedarnath for storage of packed kerosene oil and non-dangerous petroleum packed in drums.

Renewals of leasehold Rent Rolls Nos. 174, 190, 184 and 229, Elphinstone Estate, were granted on yearly tenancies on terms agreed to by the lessees.

At a meeting of the Trustees of the Port of Bombay held on 6th October, 1931, the following were the main items of business disposed of:—

The Board considered representations from the Bombay Iron Merchants' Association and the Timber Merchants for reduction of ground rents. Having regard to the fact that the rents at the Carnac Bunder Iron Market were revised only about a year ago, it was decided to inform the Association that the Trustees considered that there were no grounds for reduction. In respect to the timber occupations at Tank Bunder it was decided to reduce the extra rate for the covered areas from 50 per cent. to 25 per cent. with effect from 1st October, 1931.

The Board considered the question of the competition of motor lorries with the Port Trust Railway in regard to local traffic between the Grain Depot and the Docks. The Chairman's note pointed out that the difficulty of competing with motor lorries over a short haul was accentuated by the persistent and excessive overloading of the lorries and the inadequate fines usually inflicted by the magistrates for this offence. It was decided that as an inducement to exporters to make more use of the facilities offered by the Port Trust Railway the freight charge of Rs.14 per 20-ton wagon from Grain Depot to Docks should be made inclusive of the cost of unloading in respect of grain, seeds and oil cake traffic. The Docks charge for unloading the lorries referred to was increased to offset the greater cost of upkeep and maintenance of Port Trust roads due largely to this heavy traffic and the persistent overloading.

After considering a preliminary note by the Chairman on the subject the Board appointed a Sub-Committee of the Trustees to investigate and report on the question of further retrenchment in the Bombay Port Trust.

A lease for 99 years of Plot No. 20 (area about 1,366 sq. yards) on the Old Cotton Green, Colaba, was granted for the erection of residential flats. A renewal of leasehold Rent Roll No. 194, Elphinstone Estate (area about 405 sq. yards) was granted on yearly tenancy on terms agreed to by the lessee.

Italian Harbour Affairs

ACCORDING to statistics which have just been published by the official bulletin of the Provveditorato al Porto di Venezia (Harbour Board for the port of Venice) the following is a schedule of shipping at that port during the month of September:—

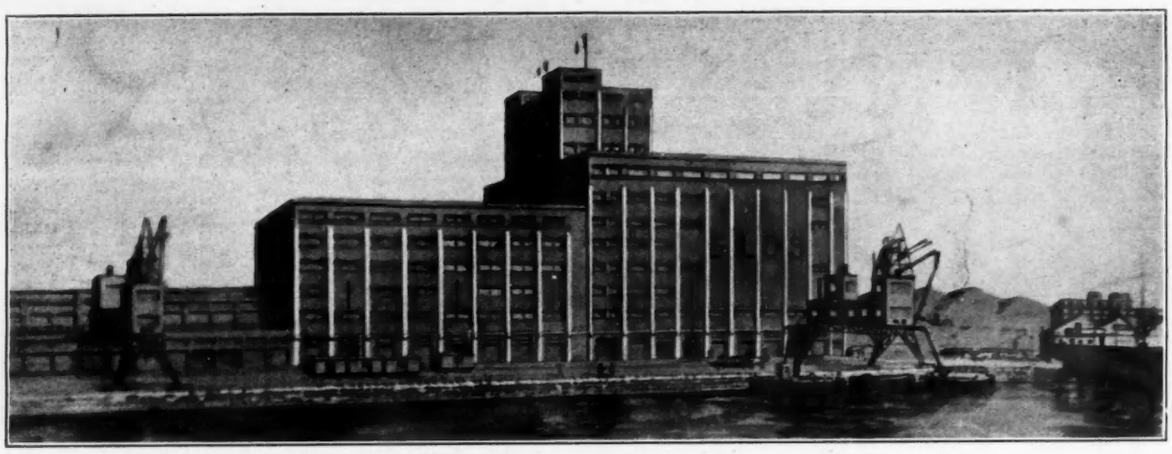
	Imports Tons	Exports Tons	Total Tons
Septembe, 1931	198,643	33,976	232,619
September, 1930	209,877	34,971	244,848
	—11,234	—995	—12,229

Total shipping at Venice during September thus shows a decrease of 5 per cent. in respect to the corresponding period of 1930, and this is chiefly due to a decline in imports. As a matter of fact arrivals show a decrease of 5.35 per cent., due to the reduced arrivals of coal (—5,000 tons), chemical fertilizers (—7,300 tons), cereals (—4,000 tons), general merchandise (—10,000 tons). This depression has been compensated by larger imports of petrol (+8,000 tons) and of building materials (+6,400 tons). The decrease in the shipments from Venice (—995 tons) is due entirely to the reduced exports of pyrite ashes. As a whole, total shipping from January 1st to September 30th has shown a decrease of 128,932 tons.

The situation is totally different in Trieste, where shipping during September has shown considerable progress, as will be seen from the following figures:—

	SEPTEMBER 1931 (Centals)	1930
Arrivals		
By Rail	621,297	803,441
By Sea	1,960,481	1,162,486
Total ...	2,581,778	1,965,927
Clearances		
By Rail	1,113,212	706,262
By Sea	517,980	533,513
Total ...	1,631,192	1,239,775
Total		
By Rail	1,734,509	1,509,703
By Sea	2,478,461	1,695,999
Total ...	4,212,970	3,205,702

Italian Harbour Affairs—continued.



The new grain Silos at Trieste now under construction.

The progress noticed during August and September has considerably influenced the situation of shipping during the period from January to September, 1931, as appears from the following figures:—

	JANUARY-SEPTEMBER 1931 (Centals)	1930
Arrivals		
By Rail	5,651,945	7,982,930
By Sea	12,961,262	11,135,405
Total ...	18,613,207	19,118,335
Clearances		
By Rail	8,325,205	7,221,335
By Sea	4,523,128	5,480,785
Total ...	12,848,333	12,702,120
Total		
By Rail	13,977,150	15,204,265
By Sea	17,484,390	16,616,190
Total ...	31,461,540	31,820,455

It should be noted that the Consiglio Provinciale dell' Economia of Trieste (Chamber of Commerce and Industry) includes the statistics also for railway traffic, but if shipping only is taken into consideration it will be seen that there has been a big increase over 1930.

Detailed figures about shipping at Italian colonial ports are now regularly published. According to the figures for Massowah (Red Sea) shipping at that port during the month of July, 1931, included the following items:—Ships arrived and cleared, 241, net register tonnage 98,789; Goods unloaded and loaded, 11,099; Passengers arrived and left, 1,188. During the month of August, 39 Italian steamers arrived at Tripoli (Libia), representing 78,952 net register tons; and 2 foreign steamers representing 5,168 net register tons, carrying a total of about 14,000 tons of goods and 2,160 passengers.

In connection with the Italian Colonial Harbour enlargements, the breakwater sheltering the inner harbour at Mogadiscio (Italian Somaliland) has been practically completed. Also the Harbour Master's Office and the Custom's House have been terminated. Some electric and some hand cranes have been provided. These important works will involve an expenditure of 20 million lire.

Another Italian Colonial harbour where port enlargements have made considerable progress is Bengasi. Already about one-third of the work has been completed. Total quayage will reach 1,600 metres, and depth of water will be about 13 metres. At present, besides the regular lines, both Tripoli and Bengasi are connected to other Continental ports by the Messina Steamship Co., of Genoa, by Messrs. Tripcovich, of Trieste, and by a newly created Jugoslav steamship service which connects Libia to Adriatic ports, and handles the greatest part of the building material imports. The Deutsche Levant Linie und Orient Dienst are contemplating including the call at Tripoli in one of their Mediterranean services.

Considerable work is also in progress at Italian ports. At Taranto, for example, the building of the Eastern mole and the respective quayage is practically completed. The construction of a sheltering wall is soon to be started, and it would appear that these works are to be completed by the end of December, 1931. A certain portion of the new quayage is to have a depth of water of 8 metres. The remainder of the quayage will have a depth of about 3 metres, and is to be used by sailing ships and small steamers.

However, the most interesting feature concerning Italian harbours this month has been the decree which has been issued by the Italian Government extending the free zone regime in the port, town and district of Fiume over an indefinite period. It should be noted that about two years ago the Italian Government, in view of the difficult position of shipping in the port of Fiume, decided to exempt goods imported in Fiume and its district, with the exception of tobacco and alcohol, from the payment of Customs duties. This concession was only made for a year and a half, and was to expire on December 31st, 1931. Owing to this exemption, Fiume attracted numerous industries, but the fact that the exemption was to cease after such a short time discouraged them in the construction of new factories, or the development of special trade with the Balkans in Fiume. In view of this fact, and in view of the expiry of the Italo-Jugoslav Nettuno agreement for the operation of the port of Fiume, railways, etc., in December of this year the Italian Government has decided to extend the free zone regime in Fiume without any limitation of time, and in order to still more encourage the development of trade and shipping it has decided to grant to new industries which would establish themselves in the free zone territory, exemption from payment of taxes of any kind.

The new grain silo, which the Azienda dei Magazzini Generali has started at Trieste, is to measure 103.61 by 40 metres, and is to be divided into three sections. The total capacity of the new gram silo will be 30,000 tons, and the handling facilities will have a capacity of about 500 tons hourly. The Trieste Harbour Board has also decided to build an air port, including a building with offices for the personnel of the air services, and rooms for passengers. A plant for the preservation of oranges and lemons in transit from Sicily or Syria to Central Europe is to be built. This plant will be fitted in warehouses No. 21 and 22 situated in the Porto Franco Vittorio Emanuele III. The question of the transit of fruit has been chiefly raised by the representatives of the Union of South Africa who are considering the port of Trieste as the most advantageous point to create a base for the distribution of fruit to Central Europe. Also in Genoese shipping quarters much interest is being shown in connection with the development of the fruit transit trade, and the Italian Government has just granted a concession for the transit through Genoa of Syrian oranges and lemons shipped to Switzerland, Belgium and Holland.

A new lighthouse which is visible at 15 miles has been installed on Punta del Vagno at Genoa in order to prevent damage to ships entering the harbour.

Traffic on "Lippe Seiten" Canal.

It may be of interest to note the following figures regarding traffic on the "Lippe-Seiten" Canal: 670,000 tons of barges loaded with 360,000 tons of goods passed the Dortmund Lock during the period January 1st to August 1st, 1931; about the same figures were noted at the other locks; the number of loaded ships was 500 and that of empty ones 330. These figures can, of course, not be compared with those of the Dortmund-Ems and the Rhine-Herne Canals, but they show that the prospects of the new canal are good. Transports of ore from Holland to Dortmund gradually take their way via Wesel-Datteln and potash transports from Hildesheim begin to prefer the new canal on their way to Holland. The canal is built for barges of 1,500 tons. About 30,000 tons of Haardt sand are sent monthly by the canal, and about 30,000 tons to 40,000 tons of coal from the mines of Auguste Victoria (I. G. Farbenindustrie) and Brassert leave their harbours on the canal and also 10,000 tons from the Fuerst Leopold Harbour at Hervest. The brick works of Idunahall also make use of the new canal.

A number of finished and semi-finished harbours are not yet working.

North-East Coast Notes.

Middle Harbour, Blyth, showing part of South Side Staiths and Cowpen Coal Company's Staiths.

Question of Diversion of Trade from the Tyne.

THE diversion of coal shipments from Tyne Dock to other places in the North-Eastern area has caused considerable perturbation to all interested, and in September a deputation, representative of the workers, who are members of the National Union of Railwaymen, waited upon Mr. G. M. Gillett, M.P., Parliamentary Secretary to the Minister of Transport, concerning the problem. They had a sympathetic reception and a promise of a full inquiry into the circumstances of the case.

The question of trade diversion has been brought rather prominently into notice so far as the Tyne is concerned, for an appreciable amount of trade has gone to the Wear, which formerly was dealt with in the Tyne. For this the town dues charged on the Tyne are blamed. These are paid by the merchant, but at Sunderland they are paid by the collieries, which many contend operate in favour of the Wear as against the Tyne. At the September meeting of the Tyne Improvement Commission, Mr. H. P. Everett, the chairman, dealt with the matter. In the first place he blamed the Northern coal-owners for the confusion, declaring that it was due to the method of fixing the prices for export. The Tyne Improvement Commission had, he said, received letters suggesting the abolition of town dues. To all there was only one answer—it was impossible. The dues constituted 20 per cent. of the Commission's total income and last year produced more than £120,000. As most knew, the dues, altered in form, came down to the Commission from the Corporation of Newcastle when they had the conservancy of the port in their charge. In their present form those dues were authorised by the Commissioners' Acts and levied on every ton of coal and coke which goes out of the Tyne. It had been said that no corresponding dues were charged at other North-East Coast ports. That was entirely erroneous. There were corresponding dues at other ports, and in some cases they were higher than the dues levied by the Tyne Commission. The incidence of the dues at other ports might be different from the incidence in the Tyne, but they were there all the same. He said that it was the fixing of minimum prices under the Coal Mines Act and their effect on trade that had produced the present controversy. He added: "The minimum price is meant to be the f.o.b. price. It is the f.o.b. price at other ports, but in the Tyne it is not. Why that anomaly should have been created is a matter for the Coal Committees which fix the prices under the Act. It has put the Tyne in an unfair position in that it has increased the minimum price by the amount of the dues."

The Finance Committee was fully alive to the situation, and as far back as May the Secretary brought the position to the notice of the Northumberland and Durham Committees, but these bodies declined to make a change.

Blyth Harbour Commission.

At the September meeting of this authority, over which Mr. Ridley Warham presided, the death of Mr. Thoroton was reported. He was for many years a member of the Harbour Commission as a landowner. His place has been filled by the appointment of Mr. J. R. Wharton.

A statement was submitted showing the coal exports for the eight months ended August 31st, 1931, which were 2,843,293 tons, compared with 3,152,175 tons in 1913 and 3,195,854 tons in 1930. This showed a decrease of 10 per cent. of 1913 and 11 per cent. on 1930.

Good Work at Wear Dock.

Another quick dispatch is reported at Sunderland South Dock. The steamer "Regfos" arrived at 11.20 a.m. on September 21st, began loading a cargo of Ryhope coal at 11.45 a.m., and finished at 11.20 the same night, sailing at 1.55 a.m. next day, having taken 2,300 tons of cargo and bunkers in 14½ hours, sea to sea.

One of the largest shipments of machinery from Sunderland for a long time was completed at the South Docks on September 23rd, when the loading of a twin set of screw quadruple engines into the French steamer "Sveti Djue" was finished and she left for France. The machinery is for a passenger vessel in the course of construction at one of the Mediterranean ports and was made at the North-Eastern Marine Engineering Company's works at Sunderland.

River Wear Commission.

The borrowing on short terms of £100,000 for capital expenditure on port improvement works was referred to by the chairman, Mr. J. E. Dawson, at the meeting of the River Wear Commission in September. The repayment of the capital sum and the repayment of the interest has been gauranteed by the Sunderland Corporation. It was not the intention at the moment, Mr. Dawson said, to raise more than a third of the sum, and the remainder will be dealt with as and when the exigencies of their requirement arose.

The trade statistics for the eight months of the year show little change in the volume recently ruling. The coal and coke shipments exhibit a decrease of 4 per cent. compared with 1930, the same figure as shown in the return for the seven months' trade. The shipments were 2,986,625, compared with 3,118,872 tons in 1930. Coke exports at 63,110 tons showed an increase of 15 per cent. The imports were 200,454 tons for the eight months, against 258,688 tons for the like period in 1930.

Reduction in Tees Tolls.

With the object of attracting more liners to the port the Tees Conservancy Commission have decided on a further cut in the tolls. This was communicated to the local Association of Chartered Shipbrokers in the following terms: "That a concession be allowed on vessels above 2,500 tons net register discharging, or loading, less than 500 tons of cargo from or to a sixpenny toll port (that is, ports in the Far East, Near East, South America, South Africa and Australia) of ½d. per net registered ton off the river toll (this being equal to ½d. per ton plus 33⅓ per cent. in the ultimate charge) representing an average allowance of between 11 and 12 per cent. on such transactions."

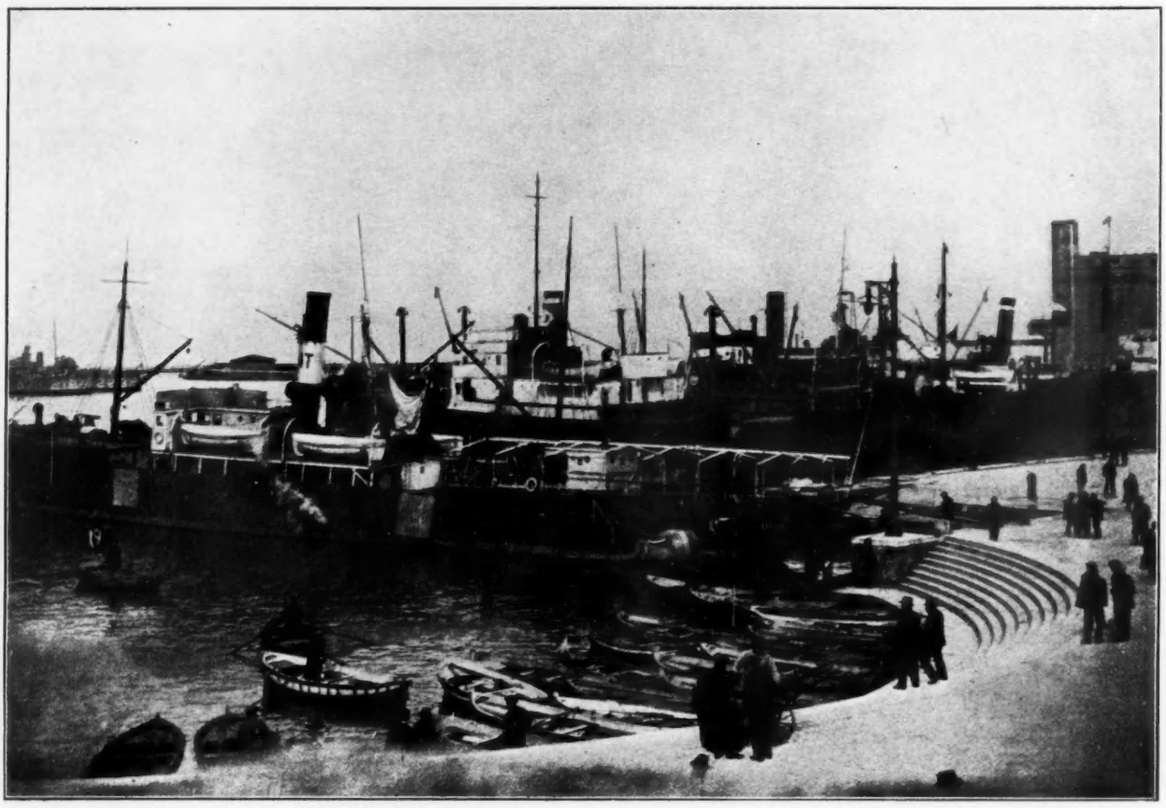
The Commissioners state the present concession on discharging up to 225 tons of cargo from sixpenny toll ports afterwards loading cargo outwards will still remain in force as heretofore, namely, £3 per vessel, plus 33⅓ per cent., as the inward charge.

Hopeful Sign on the Tyne.

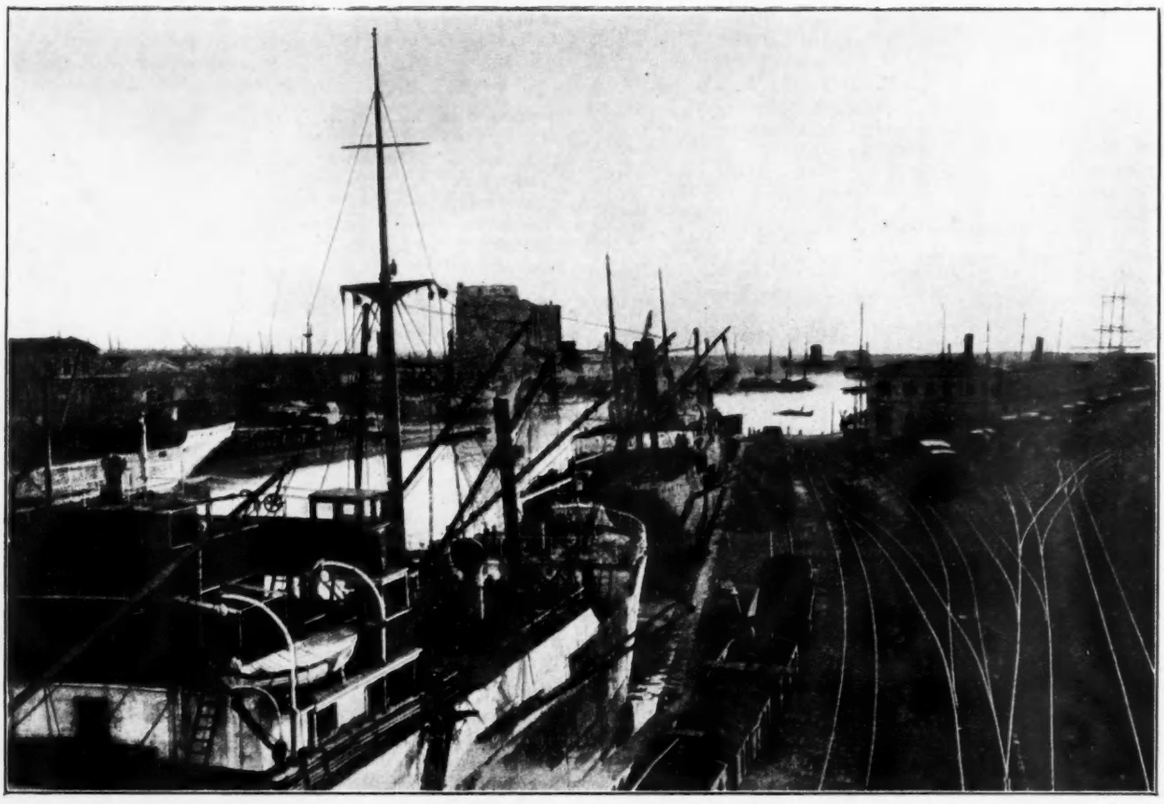
The reports submitted at the October meeting of the Tyne Commission were generally of a disappointing character, but there was one report which noted an improvement, and that was as to the amount of idle tonnage in the river. At the end of September there were 142 vessels of 282,816 tons laid up, compared with 153 vessels of 285,576 tons at the end of August. That was a decrease of 11 vessels, and by October 15th that number had increased to 18, making the total 135 vessels. On the recommendation of the Docks and Trade Committee the following resolution was passed: "That in view of the serious fall in the export of coal from the Tyne and other North-East Coast ports, the Government be requested to investigate how far this drop is attributable to the quota and price restrictions of coal exports under the Mines Act, and whether these restrictions ought to be removed."

The coal and coke shipments still show decreases, and for the nine months to the end of September the shipments were 10,377,179 tons, against 12,974,136 tons last year, a decrease of 2,596,957 tons, or 20.02 per cent.

The Port of Leghorn



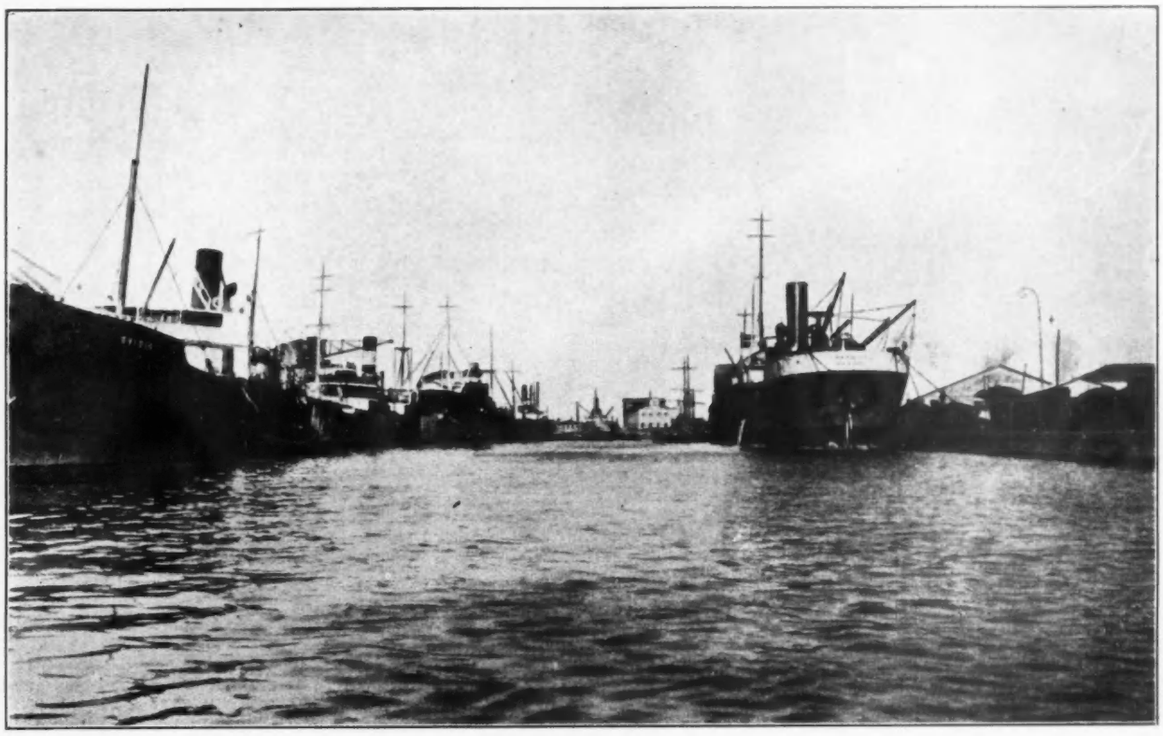
The "Porto Mediceo." The "Andana degli Anelli."



The Firenze Dock. View from the Land.

The Port of Leghorn and its Development

By ANTONIO GIORDANO



The Firenze Dock. View from the Sea.

Historical.

IN the past it is said that the territory of Leghorn used to be fully covered by water and only small hills were noticeable as islands, among the marshes. Perhaps where Leghorn now opens its port to vessels, a temple or a building of squared blocks guided the very few canoes of the ancestors of the present inhabitants of Leghorn.

If the experts are considering as legendarious the Temple of Ercole Labrone there is no doubt, from the various monuments, coins, etc., which it has been possible to recover, that since the time of the Roman Empire a community existed around a Castrum Liburni, presented in 1103 by Countess Matilde to the Republic of Pisa, and adjoining what is now the Harbour of Pisa.

The original creators of the Port of Leghorn, who realised its favourable position as the only outlet of Central Italy on the Thyrrenean Sea, and who insisted upon its enlargement, were the members of the Medici Family who had built the main part of the present town of Leghorn.

In 1571 the new port was built, known at present as Porto Mediceo, and this was completed in 1618. This work marked the beginning of the prosperity of Leghorn and in 1606 the Duke Ferdinando I. Medici declared Leghorn a " town."

The port proved so prosperous and was so appreciated that in order to secure the monopoly on it, the British and Dutch Fleets came to war off the port on March 13th, 1635, the Dutch emerging victorious.

Since then, shipping at Leghorn has shown an increasing tendency and this will show a further increase when Leghorn is connected with the railway line from Turin to Rome.

Progress of the Port.

In connection with the detailed progress of the Port of Leghorn it may be noted that Cosimo I. Medici planned the connection of the lighthouse, which already existed in 1163, to the mainland by means of a large pier. The project was prepared by Giorgio Vasari, the well-known Italian architect, of whom there are many traces in the various Italian towns, and its realisation was started under the Duke Ferdinando I., but Cosimo II. dropped the idea, considering it too expensive, and from 1609 to 1617 built the Porto Mediceo, which is now the old Port of Leghorn. In 1852 the project of Cosimo I. was again taken into consideration by Duke Leopold with the construction of the " molo curvilineo," which has been completed, later on with the Vegliaia breakwater, which was built for protection against the strong " libeccio " and " scirocco " winds. In 1852 the construction of the " molo rettilineo " had been started, as also was the maritime station which was completed in 1858. During the period from 1864 to 1866, there was constructed the new dock (Darsena Nuova) and the channel connecting the same with the Porto Mediceo, as well as the new dry dock. From 1870 to 1878 the " diga rettilineo " was enlarged and the Mandraccio Dock was built. In 1905, the project of constructing the new dock outside the old dock of the Mandraccio, and the channel connecting the new dock with the Navicelli canal was completed. Finally, in 1909, the project regarding the construction of the new Dock Vittorio Emanuele III. and the construction of the following works had been planned:—

(a) The construction of the Marzocco breakwater, measuring 1,424 metres in length.

(b) The construction of a quay on the " molo rettilineo " for a length of 700 metres with a depth of 9 metres of water.

(c) The construction of the Meloria breakwater from the northern head of the " molo curvilineo " towards north-west for a length of 700 metres.

(d) The construction of auxiliary works.

During the construction of these works it has been necessary to slightly alter the project with the construction of the Pisa Dock with the long side from north to south built on the fairway of the Marzocco.

The total quayage in the port of Leghorn at present is about 5,000 metres, and includes:—

(a) The outer harbour or new harbour with the Vittorio Emanuele Dock and the oil dock.

(b) The Mediceo or old port used for coal, phosphate, nitrate and general cargo trade and sub-divided into:—

(1) Bacino Mediceo.

(2) Bacino Cappellini, where there is a depth of water of 7 metres and comprising the Orlando and Free Port (Deposito Franco) quays fitted with electric cranes. This basin is connected to the maritime railway station by means of a canal.

(3) Bacino Firenze, which is entered from the Bacino Cappellini, through an opening of 45 metres, and which has a depth of 8.50 metres. The canal leading to Pisa starts from this basin.

(4) Darsena Vecchia.

(5) Darsena Nuova.

All these quays are built on the " Inglese system " and they are fitted with:—(a) 12 electric cranes of 1.5, 3, 5 and 20 tons; (b) 4 electric elevators for coal; (c) 2 electric elevators

The Port of Leghorn—continued

for cereals. These unloading facilities are operated by the Chamber of Commerce, which has just taken up the question of building a large marble electric elevator of 30 tons with a view to meeting the requirements of the growing Carrara marble shipments through this port. The elevator is to be erected on the Orlando Quay.

Large grain silos also exist in the port of Leghorn.

About 2,500 metres of quayage are also provided with railway lines connecting them to the Leghorn Central Railway Station.

The Port of Leghorn has also a "free port," which is administered by the Town Authorities, and which was opened in 1883. The warehouses on the first floor measure 6,089 square metres respectively and have a capacity of 32,135 cubic metres, and on the second floor 2,880 square metres with a capacity of 17,280 cubic metres. The area to be utilised for storage of goods in the open air reaches 3,955 square metres.

Recently the organisation of the General Bonded Stores, owned by the S.A. Magazzini Generali di Livorno, and situated in the zone of the Maritime station to which they are connected through two double railway lines was completed. By means of a canal the warehouses are connected with the port. This organisation consists of 15 warehouses of 1,245 square metres divided into two sections; one for foreign and one for national goods.

In 1924 the grain silos owned by the S.A. Silos Livornesi and situated on the free port quay of the Cappellini Dock, and which can handle 120,000 centals of wheat at one time, were put into operation. The silos have been built for public trade, and are operated on the free port regime while the following operations may be undertaken:—

(a) Transhipment from ship to ship with or without weighing.

(b) Unloading from ship to silos with weighing at entry.

(c) Unloading from silos to ship with weighing of grain when leaving the silos.

(d) Unloading from the silos to railway cars with weighing and sacking at leaving on the basis of 60 tons per hour.

All the operations considered under points a, b and c are undertaken at the basis of 100 tons per hour with weighing and 200 tons without weighing.

Traffic of the Port.

In order to understand the importance of the Port of Leghorn, the following figures regarding the goods unloaded and loaded in the course of the past 37 years should be considered:

STEAMERS

Year	No.	N.R.T.	TONS Goods Unloaded	TONS Goods Loaded	TONS Total Goods
1894	3,598	2,995,975	390,918	117,664	508,582
1895	3,638	2,915,077	416,308	130,147	546,455
1896	3,707	2,858,196	420,212	142,130	562,342
1897	3,414	3,104,959	441,363	165,730	607,093
1898	3,501	3,357,725	565,049	174,720	739,769
1899	3,477	3,270,498	525,417	194,367	719,784
1900	3,438	3,281,092	539,433	170,622	710,055
1901	3,556	3,561,842	613,764	171,541	785,305
1902	3,654	3,754,615	632,019	194,574	826,593
1903	3,709	3,800,996	587,679	206,663	794,342
1904	3,827	3,984,732	641,770	199,176	840,946
1905	3,997	4,347,612	679,997	222,124	902,121
1906	4,122	4,503,751	952,201	247,795	1,199,996
1907	4,197	4,464,362	903,880	265,435	1,169,315
1908	4,457	4,713,641	950,875	277,440	1,228,315
1909	4,632	4,946,037	1,016,867	265,102	1,281,969
1910	4,541	4,724,333	966,710	261,468	1,228,178
1911	4,596	4,895,218	1,071,660	268,625	1,340,285
1912	4,873	5,329,734	1,097,380	309,840	1,407,220
1913	4,688	5,225,260	1,111,188	296,235	1,407,423
1914	4,409	5,030,587	1,053,085	242,661	1,295,746
1915	4,116	4,882,535	1,493,353	177,921	1,671,274
1916	2,933	3,718,027	1,602,779	169,957	1,772,736
1917	1,625	2,140,338	1,072,794	95,434	1,168,228
1918	1,301	1,791,307	1,172,544	93,050	1,265,599
1919	1,703	2,329,680	1,090,646	121,143	1,212,589
1920	2,019	2,481,626	762,318	173,255	935,573
1921	2,422	3,009,621	756,265	128,943	885,208
1922	2,976	3,836,371	864,309	176,530	1,040,839
1923	3,614	4,382,098	1,128,388	187,853	1,316,241
1924	3,668	4,767,080	1,437,374	256,682	1,694,056
1925	4,032	5,443,395	1,449,849	303,071	1,752,920
1926	3,748	5,470,955	1,347,767	304,375	1,652,142
1927	4,034	6,173,122	1,724,072	313,670	2,037,742
1928	4,143	6,435,356	1,464,483	314,688	1,779,171
1929	4,403	6,722,557	1,591,182	322,279	1,913,461
1930	4,915	7,338,419	1,474,178	321,689	1,795,807

SAILING VESSELS

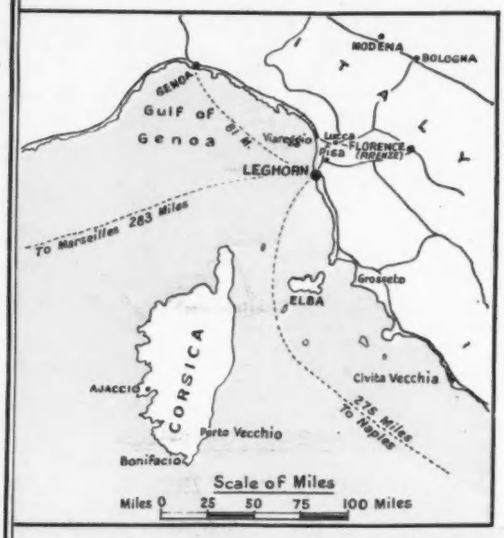
Year	No.	N.R.T.	TONS Goods Unloaded	TONS Goods Loaded	TONS Total Goods
1894	4,293	209,955	93,292	55,776	149,068
1895	4,156	217,811	111,218	51,880	163,098
1896	4,343	228,855	114,348	63,626	177,974
1897	4,700	238,846	120,791	55,891	176,682
1898	4,850	237,804	119,217	70,445	189,662
1899	4,825	240,209	133,183	82,294	215,477
1900	4,730	250,668	152,185	76,136	228,321
1901	4,840	256,548	141,171	76,619	217,790
1902	4,406	232,403	142,255	61,493	203,748
1903	4,474	241,021	153,030	54,638	207,668
1904	4,511	241,647	155,122	59,184	214,306
1905	4,539	250,839	165,077	68,182	233,259
1906	4,812	263,867	188,786	80,711	269,497
1907	4,918	221,291	184,712	67,714	252,426
1908	4,478	207,298	170,656	67,429	238,085
1909	4,252	195,379	162,917	66,221	229,138
1910	4,427	202,787	181,647	70,312	251,959
1911	4,461	212,954	195,024	73,685	268,709
1912	4,167	198,823	167,267	77,154	244,421
1913	4,147	196,313	159,681	93,286	252,967
1914	3,949	197,534	156,078	91,636	247,714
1915	3,118	212,886	175,025	81,505	256,530
1916	2,782	216,491	184,075	61,753	245,828
1917	2,298	105,794	89,571	31,049	120,620
1918	2,547	126,820	96,941	43,030	139,971
1919	2,616	146,445	119,087	35,045	154,132
1920	2,519	129,628	105,290	33,879	139,169
1921	2,365	123,350	96,163	38,343	134,506
1922	2,473	143,394	106,092	63,445	169,537
1923	2,306	158,712	117,227	64,428	181,655
1924	2,279	180,137	120,055	61,106	181,161
1925	2,510	166,643	120,390	79,280	199,670
1926	2,618	176,889	137,839	80,345	218,184
1927	2,494	171,002	112,600	97,163	209,763
1928	2,456	160,921	104,290	94,717	199,007
1929	2,785	204,254	105,122	127,218	232,340
1930	2,337	180,874	83,337	105,458	188,795

TOTAL STEAMERS AND SAILING VESSELS

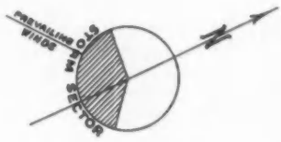
Year	No.	N.R.T.	TONS Goods Unloaded	TONS Goods Loaded	TONS Total Goods
1894	7,891	3,165,830	484,210	173,440	657,650
1895	7,794	3,132,888	527,526	182,027	709,553
1896	8,050	3,087,051	534,560	205,756	740,316
1897	8,114	3,343,823	562,154	221,621	783,775
1898	8,351	3,595,529	614,266	245,165	929,431
1899	8,302	3,510,707	658,600	276,661	935,261
1900	8,168	3,531,761	691,618	246,758	938,376
1901	8,396	3,818,390	754,935	248,160	1,003,095
1902	8,060	3,987,018	774,274	256,067	1,030,341
1903	8,183	4,042,017	740,709	261,301	1,002,010
1904	8,338	4,226,379	796,892	258,360	1,055,252
1905	8,536	4,598,451	845,074	290,306	1,135,380
1906	8,934	4,767,618	1,140,987	328,506	1,469,493
1907	9,115	4,685,653	1,088,592	333,149	1,421,741
1908	8,935	4,920,939	1,121,531	344,869	1,466,400
1909	8,884	5,141,416	1,179,784	331,323	1,511,107
1910	8,968	4,927,120	1,148,357	331,780	1,480,137
1911	9,187	5,108,172	1,266,684	342,310	1,608,994
1912	9,040	5,527,551	1,264,647	386,994	1,651,641
1913	8,835	5,421,537	1,270,869	389,521	1,660,390
1914	8,358	5,228,121	1,209,163	334,297	1,543,460
1915	7,234	5,095,421	1,668,378	259,426	1,927,804
1916	5,715	3,934,518	1,786,854	231,710	2,018,564
1917	3,923	2,246,132	1,162,365	126,483	1,288,848
1918	3,848	1,918,127	1,269,490	136,080	1,405,570
1919	4,319	2,476,125	1,209,733	156,988	1,366,721
1920	4,538	2,611,254	867,608	207,134	1,074,742
1921	4,787	3,132,971	852,428	167,286	1,019,714
1922	5,449	3 979,765	970,401	239,275	1,210,376
1923	5,920	4,540,810	1,245,595	252,281	1,497,876
1924	5,947	4,947,217	1,557,429	317,788	1,875,217
1925	6,542	5,610,038	1,570,239	382,351	1,952,590
1926	6,366	5,647,844	1,485,606	384,720	1,870,326
1927	6,528	6,344,124	1,836,672	410,833	2,247,505
1928	6,599	6,596,277	1,568,773	409,405	1,978,178
1929	7,188	6,926,811	1,696,304	449,497	2,145,801
1930	7,252	7,519,293	1,557,515	427,147	1,984,662

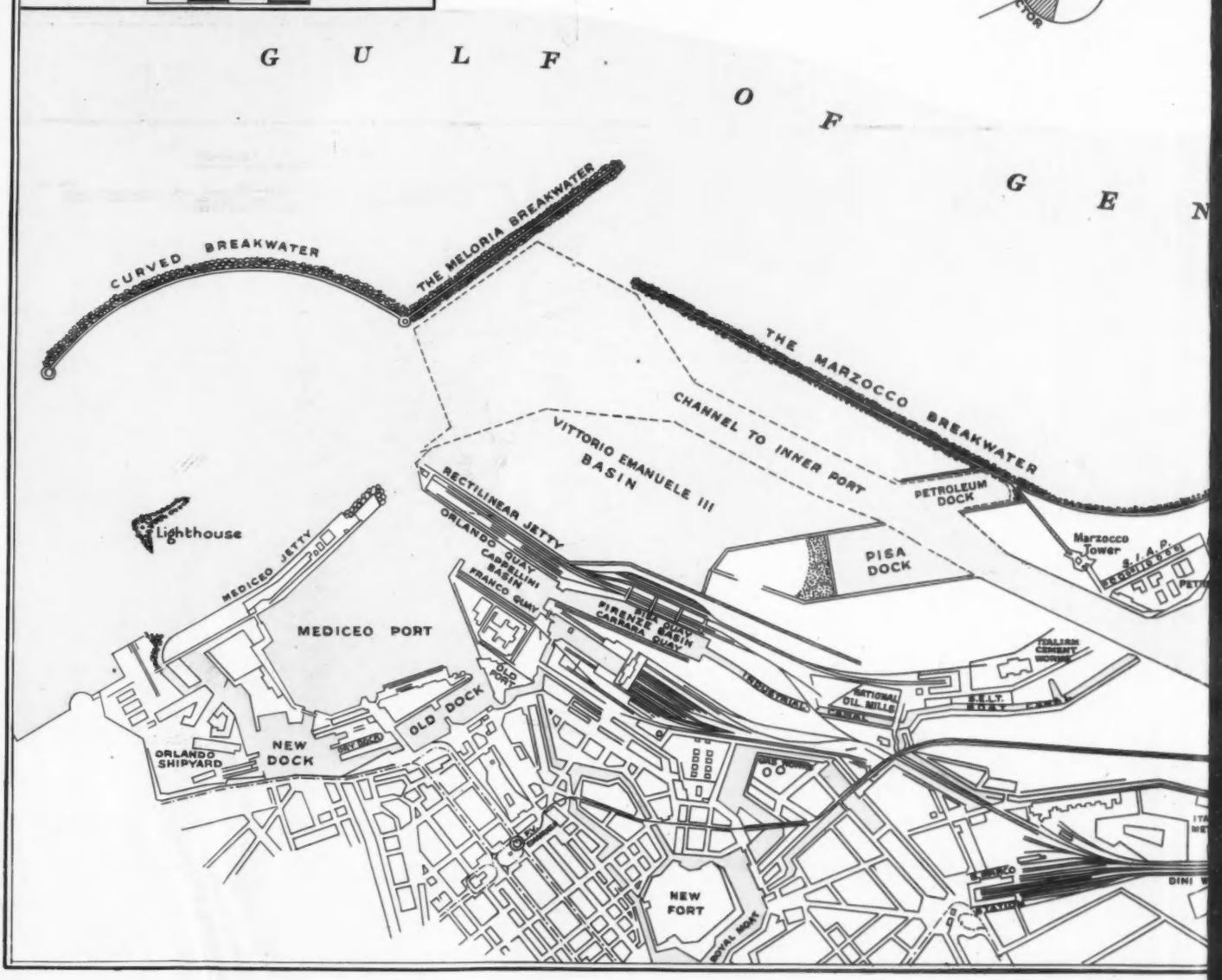
Year	Coal Unloaded Tons	Fares & Fees collected by Customs Lire	Maritime Railway Station Departures Tons	Maritime Railway Station Arrivals Tons	Maritime Railway Station Total Tons
1894	274,853	8,471,398	277,489	68,173	345,662
1895	252,023	8,776,860	287,651	72,866	360,517
1896	258,506	9,855,924	291,543	85,718	377,261
1897	294,551	7,956,576	280,531	92,660	373,191
1898	324,103	8,858,372	357,839	92,886	450,725
1899	327,930	8,820.891	283,239	91,559	374,798
1900	369,596	8,258,588	319,131	79,752	398,883
1901	371,302	12,445,241	363,415	74,726	438,141
1902	357,551	12,768,687	328,515	90,652	419,167
1903	380,970	10,195,552	399,001	99,158	498,159
1904	404,994	8,583,185	400,197	102,748	502,945
1905	408,207	13,309,143	553,324	115,705	669,029
1906	567,069	17,937,836	592,147	133,590	725,737
1907	570,108	13,178,024	627,229	131,472	758,701
1908	615,297	13,802,543	620,115	141,981	762,096
1909	632,534	19,037,980	721,163	168,474	889,637
1910	657,688	16,938,377	743,306	176,379	919,685
1911	698,543	16,585,992	794,574	174,329	968,903
1912	669,958	19,842,668	859,010	212,438	1,072,048
1913	713,997	17,731,867	842,490	224,621	1,067,111
1914	769,102	11,616,899	800,569	227,685	1,028,254
1915	895,948	10,800,229	1,158,292	219,868	1,378,160
1916	1,059,512	14,770,563	1,302,615	165,434	1,468,049
1917	407,256	18,416,217	938,699	149,670	1,088,369
1918	399,091	23,151,953	926,595	193,179	1,119,774
1919	512,566	42,622,644	972,882	139,510	1,112,392
1920	415,768	38,908,102	681,069	185,220	866,289
1921	409,250	28,925,134	696,744	150,085	846,829
1922	559,927	39,844,937	759,763	204,643	964,606
1923	790,582	94,597,586	1,010,785	222,948	1,233,733
1924	904,936	49,202,936	1,248,939	282,804	1,531,743
1925	898,546	49,792,430	1,288,603	376,908	1,665,511
1926	905,673	48,708,386	1,241,491	359,927	1,601,418
1927	1,291,883	57,715,087	1,438,139	383,495	1,821,634
1928	936,633	166,668,668	1,198,756	358,295	1,557,051
1929	1,166,815	159,917,653	1,316,543	380,210	1,696,753
1930	905,533	174,048,712	1,028,434	343,010	1,371,444

PORT OF LEGHORN.



NOTE;- Proposed New Basins are coloured Dark Blue.





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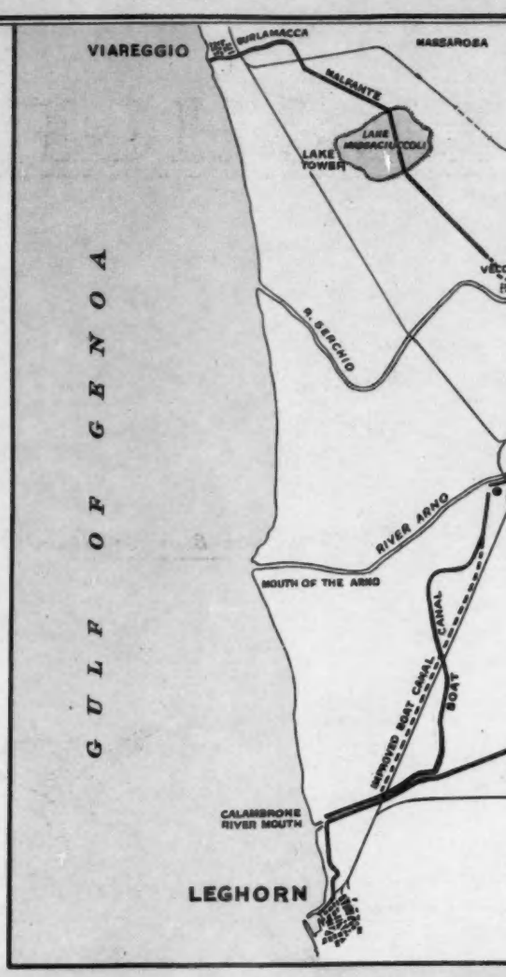

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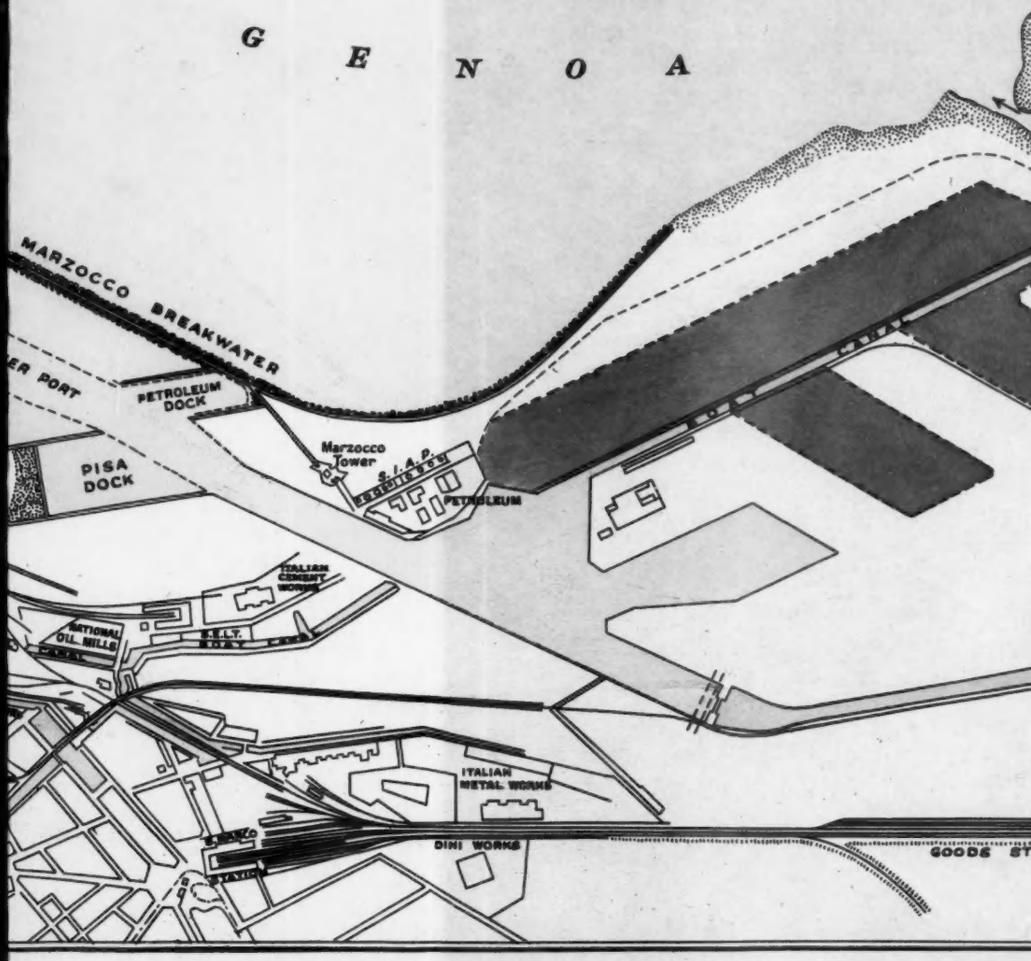

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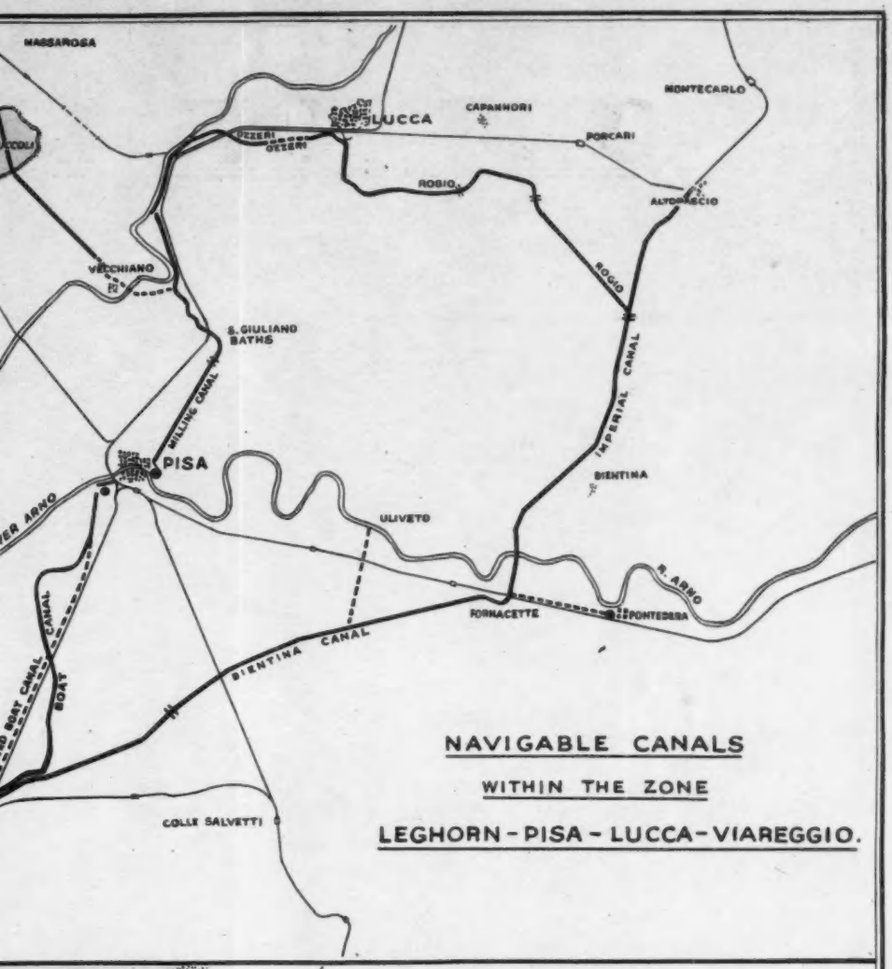
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S. GIULIANO BATHS
MILLING CANAL
ROGIO
IMPERIAL CANAL
PISA
BIENTINA
ULIVETO
R. ARNO
FORNACETTE
PONTEDERA
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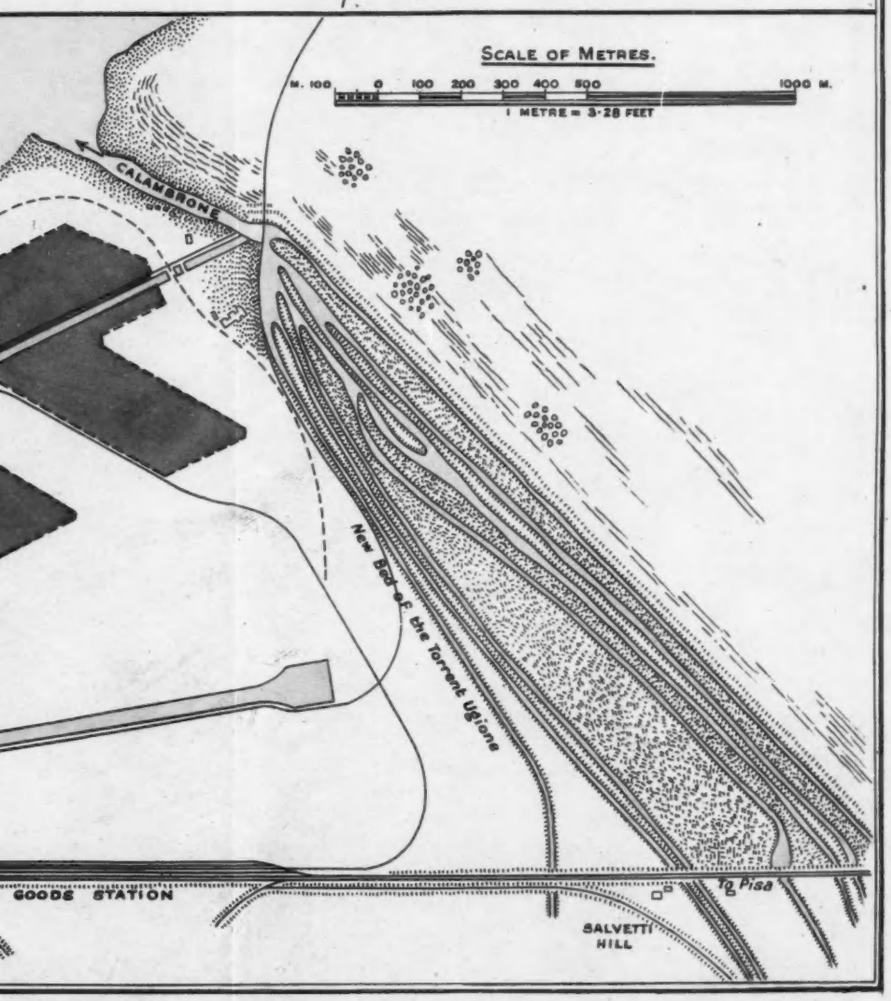
COLLE SALVETTI
NAVIGABLE CANALS
WITHIN THE ZONE
LEGHORN - PISA - LUCCA - VIAREGGIO.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New Bed of the Torrent Ugione
To Pisa
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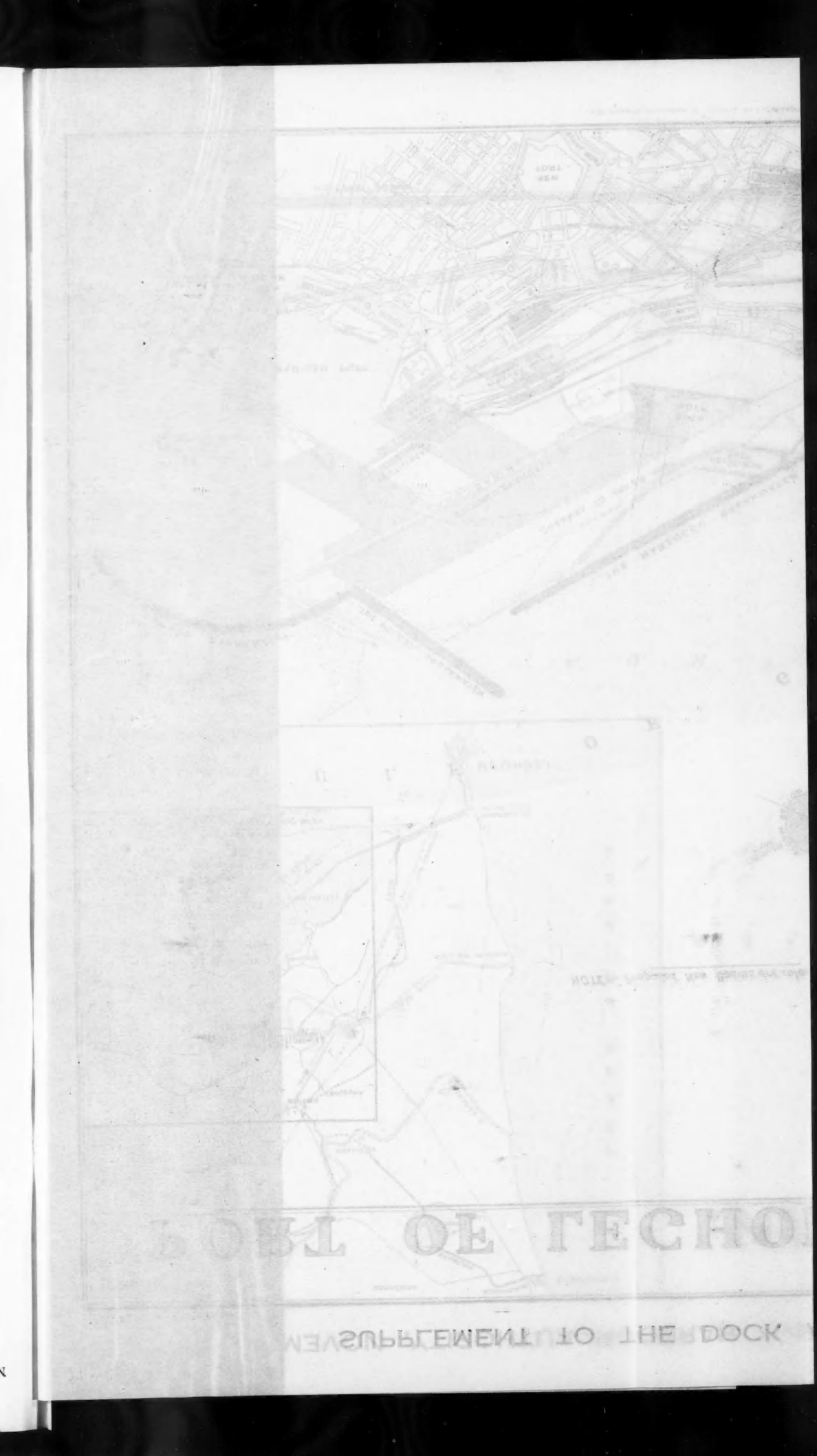
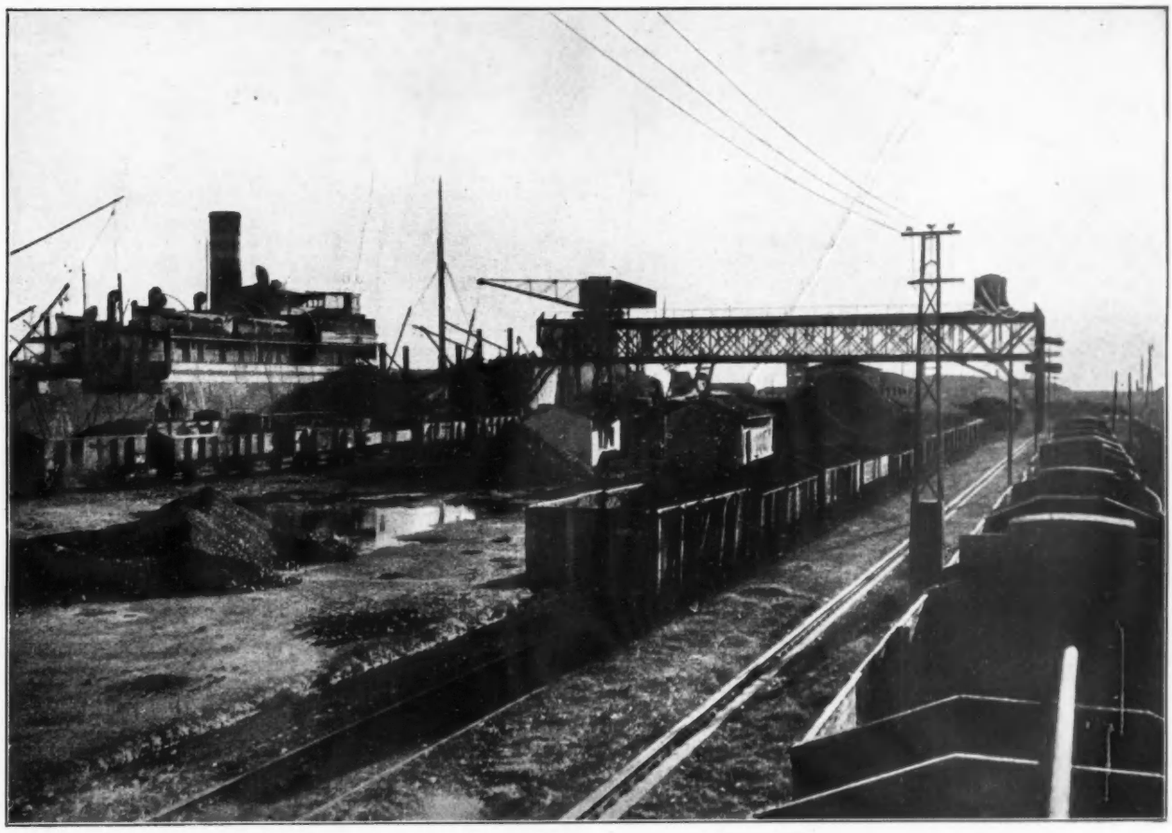
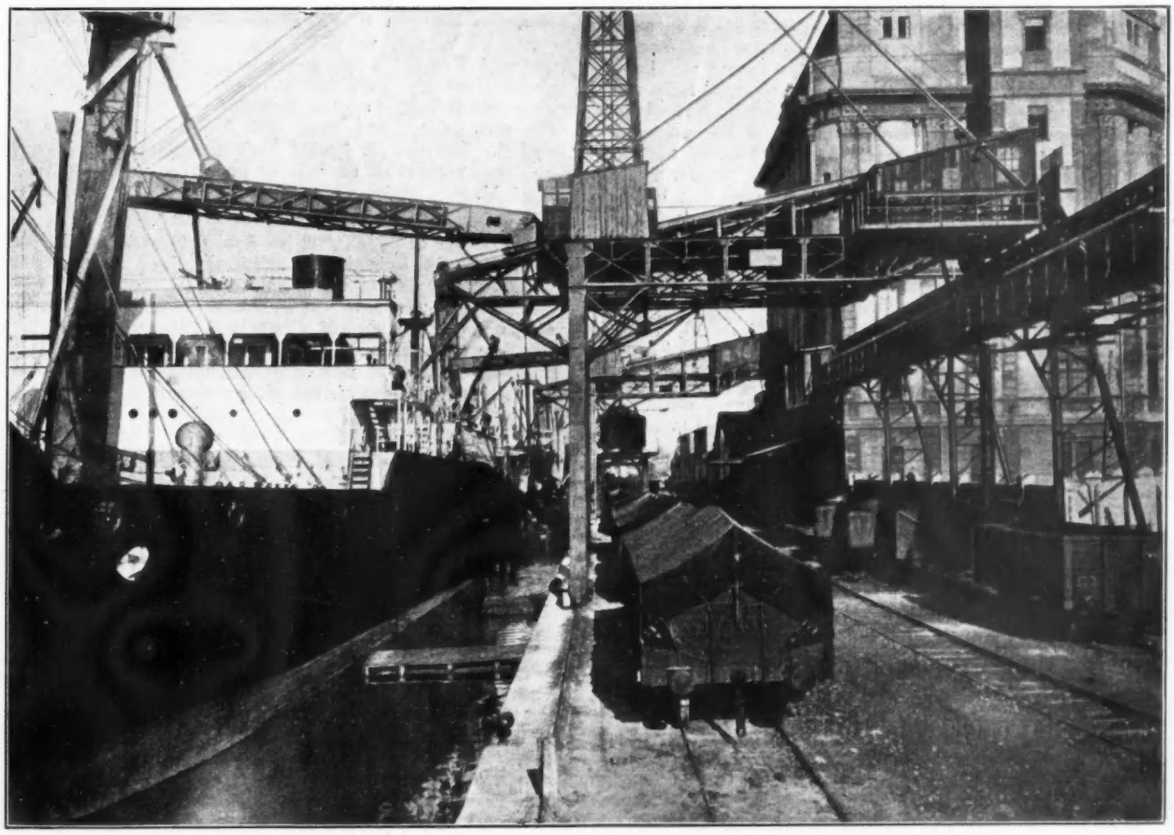


The Port of Leghorn

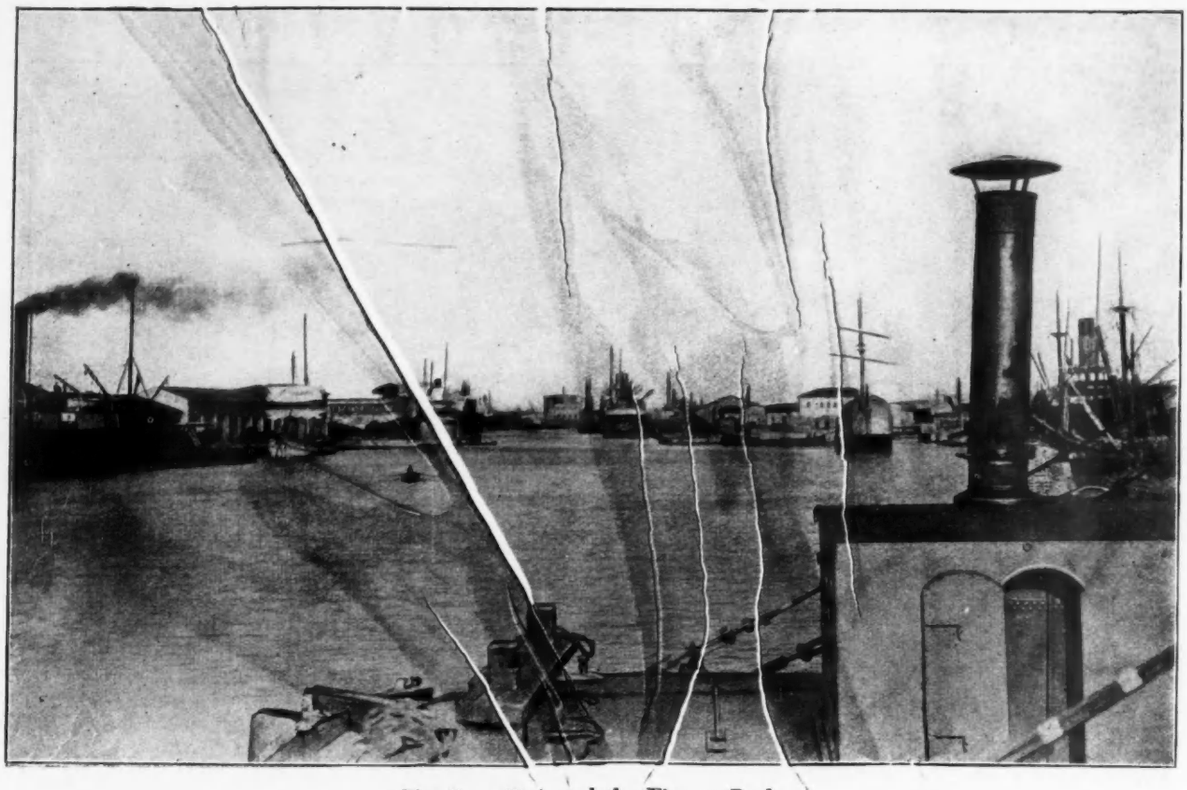


The Pisa Quay in the Firenze Dock, reserved for the Coal Trade.



The Free Port Quay in the Cappellini Dock, near the Grain Silos.

The Port of Leghorn—continued



The Cappellini and the Firenze Docks.

It will be noticed that goods unloaded at Leghorn have reached figures which are even higher than those before the war. As a matter of fact the highest figure in the pre-war period was 1,270,869 tons in 1923, whereas in 1927 it reached 1,836,672 tons and there is no doubt that this increase has been influenced by the development of the coal trade. However, if the volume of goods unloaded has shown an increase from about 850,000 tons in 1921 to 1,600,000 tons in 1925, viz., about 750,000 tons, the imports of coal had risen from 400,000 tons in 1921 to 900,000 tons in 1925, viz., 500,000 tons. Now this shows that the general cargo trade greatly improved during the war at Leghorn, thus confirming that the importers of Central Italy are showing a preference to this harbour for this trade, but where this fact appears to be much more evident is in the progress of exports from Leghorn which reached about 400,000 tons in 1913, but had risen to about 450,000 tons in 1929. If the above figures are compared it will be seen that both now and before the war, exports from Leghorn represent about one-quarter of the imports, whereas figures both at Genoa, Naples and Venice were much lower. Leghorn is thus in a better position than other Italian ports in connection with the proportion between imports and exports, and consequently it offers a better opportunity to regular steamship services from West Italian ports. It may safely be said that Leghorn occupies the second place among Italian harbours in connection with exports since it ought to be remembered that the greatest part of the goods exported from Trieste are of foreign origin. The following figures concerning the exports during 1929 from the various Italian ports are a confirmation of the above: 1,098,452 tons from Genoa, 876,333 tons from Trieste, 435,990 tons from Leghorn, 434,593 tons from Naples, 423,026 tons from Fiume, and 177,199 tons from Catania.

Connections with Industrial Centres.

It ought to be considered that the Port of Leghorn has a certain advantage both over Genoa and Venice in connection wiht certain Italian industrial centres such as Parma, Bologna, and Florence, as is shown by the following figures:—

	Leghorn Kms.	Genoa Kms.	Venice Kms.
Parma	196	204	250
Florence	101	246	293
Bologna	233	300	160

Taking into consideration the fact that the construction of the so-called " direttissima " will shorten the distance between Florence and Bologna, it will be recognised that the influence of the Port of Leghorn will still increase over the whole of Central Italy, especially if it is taken into consideration that the Government has made several important allowances to develop the inland waterways connecting Leghorn to the hinterland through the Canale dei Navicelli and the Arno River.

The present railway facilities are quite inadequate, and there is under consideration the following project regarding railway improvements:—

(a) The construction of a line from Leghorn to Pontedera.

(b) The construction of a line from Prato to Empoli.

(c) The reconstruction of the line from Leghorn to Florence in the zone of the Gonfolina near Carmignano.

If these projects are undertaken the distance from Leghorn to Florence will be reduced to 90 kilometres, the distance from Leghorn to Bologna to 175 kilometres and the distance from Leghorn to Verona to 289 kilometres (the distance between Genoa and Verona is 289 kilometres) and for this reason the Leghorn Harbour Board has considered the opportunity of enlarging the present harbour facilities.

The new project has been worked out by Ing. Coen Cagli, one of the best-known Italian harbour engineers, with a view to the construction of an interior port type undertaken by the S.I.C.A.M.

New Works.

An allowance of 85,000,000 lire has been made for the accomplishment of the following works which have been practically terminated, and are to be inaugurated by the end of 1932:—

(a) A canal through the Vittorio Emanuele III. Dock, having a depth of water of 9 metres.

(b) A special oil port.

(c) 1,800 metres of new quayage having a depth of water of 9 metres and 1,300 metres of new quayage, having a depth of water of 4 metres.

The project of Ing. Coen Cagli views, however, the construction of two additional docks similar to the one which is being built, and to be situated towards the Calabrone.

The new quays under construction will be provided with four warehouses with an area of 3,000 square metres and with the various electric cranes of 1.5 tons and 3 tons each.

If one examines the general map of the Port of Leghorn it will be noticed that in order to improve the efficiency of the new harbour it will be necessary:—

(a) To slightly remove the oil port which could be situated at the entrance of the port, if it was built beyond the Marzocco breakwater.

(b) To increase the depth of water from 4 to 9 metres for a length of about 800 metres along the Southern Dock, in the part between the Canale dei Navicelli and the removable bridge which will have to be built on the north-eastern head of the above-mentioned dock.

(c) To undertake the construction of quayage on the outside part of the " molo rettilineo " for the mooring of large liners connecting Italy with Central and South America where Leghorn exports vast quantities of goods.

In addition to the commercial harbour which the S.I.C.A.M. is building west from the old port, an industrial zone is being

The Port of Leghorn—continued

created along the line of that, which already exists in the Marghera district of the Port of Venice, on the ground arising from the works which must be undertaken for the construction of the new port. Such zone is to be included in the free Port of Leghorn which is to be established according to a recent decree, and the S.I.C.A.M. has already sold a part of it to certain industrial enterprises such as the Royal Dutch and the Standard Oil Company which have, through their Italian subsidiaries, erected large coasting stations in this district.

An important factor of the prosperity of industries in the new industrial zone is the fact that recently a large electric power house has been built, which can use oil, pulverised coal and ordinary coal as fuel, and which is to supply electricity at a very low price.

Furthermore, as is shown on the supplement, the Port of Leghorn is also connected to its hinterland by important inland waterways, having a development of about 127 kilometres. The Canale dei Navicelli connects Leghorn with Pisa and with the Arno River, which unfortunately is not navigable up to Florence, but there is a project under consideration which would enable 100-ton lighters to reach Florence. Now the course of the canal is being altered, and when completed it will have a length of 17,477 metres, that is to say 5,072 metres less than the old course. It is expected that this work will be completed in the course of the next few months. It is being planned to establish regular connections with 600-ton iron barges towed by Diesel engine-propelled tugs.

The Port of Leghorn has steamship connections with all parts of the world, but the liners of the Navigazione Generale Italiana and of the Lloyd Sabaudo bound for Genoa to New York are not calling here, and the marble from Massa Carrara, which is one of the main articles of export from Leghorn, is taken to Genoa by sailing ships and it is there transhipped to vessels bound for overseas ports. Recently the Leghorn harbour authorities have arranged that ships of the Navigazione Libera Triestina connecting West Italian ports to North American ports, and that ships of certain Italian lines connecting Genoa with South America should also call at Leghorn.

Irish Harbour Matters

Cork

Cork Harbour Board: Fall in Income from Dues.

MR. F. J. SCANNELL, F.I.A.A., in his report as auditor of the Cork Harbour Board's accounts for the year ended July 31st, 1931, writes: "The income from tonnage dues and dues on goods for the year amounted to £80,753 4s., as compared with £93,913 3s. 11d. Stocks aggregating £1,700 were bought in and extinguished during the year by means of sinking fund. The cash in bank to credit of sinking fund is £6,480 14s. 6d. I recommend that this amount be invested in accordance with statute. Reserve contingency and insurance fund shows a reduction of £8,479 7s. 9d., as compared with the previous year, principally due to payments out of the fund, of repairs to the Owenabuee and Owenacurra hoppers, and part salvage costs, Owenacurra hopper amounting to £11,619 19s. 6d. However, the latter amount is repayable to the fund from revenues during the next five years. In my opinion the proposed period of repayment should be restricted, should results warrant. An old borrowing from the bank of £7,011 in respect of improvements to lower harbour appears as a liability from year to year, and provision should be made to liquidate same, which would result in an annual saving of over £200 in interest. Subscriptions aggregating £1,219 were applied out of revenue, and this outlay is not strictly within powers conferred on the Commissioners as to the application of their revenues. There are contingent claims arising from the Cork Harbour Act, 1883, Section 9, and full provision has been made for these, the amount to July 31st, 1931, being £4,716 1s. 6d. It affords me great pleasure to testify as to the satisfactory manner in which the books and extensive records have been kept by your accountant, Mr. Fitzgerald. I have received every facility from the general manager and staff during the progress of the audit."

Engineer's Report.

The Engineer's Report states that "the quays, piers, wharves and other property in the Port of Cork have been maintained in good and proper order, and your plant and machinery in efficient working order. The accounts show the value of your plant as £68,146 14s. 5d., or £5,660 1s. 7d. more than in 1897. The cost of dredging, inclusive of pumping, for the year is £22,447 11s. 10d., for a total output of 401,444 tons, at a cost of 13.4d. or 4.5d. over last year. This is accounted for by special charges for the Owenabuee and Owenacurra hoppers. This output reduces arrears of dredging to 644,318 tons. The special works for the year were the completion of the replacement of the South Jetties' Wharf and replacing a portion of Anderson's Quay, the latter being still in hand." Miscellaneous outlay amounted to £2,770 14s. 7d., as compared with £4,676 10s. 9d. last year.

Cork Harbour Chairman's Review.

Mr. Richard Wallace, chairman of the Cork Harbour, in a review of the development of the Port of Cork said that the construction of a new wharf in 1912 gave rise, indirectly, to the Tivoli scheme. The wharf was originally intended as a timber depot, but the merchants failed to come to any arrangement with the Board for the use of the area, and finally the land was sold to Messrs. Henry Ford and Son. That naturally cut off quay development on the south side of the River Lee, and the Commissioners finally decided on the reclamation of the sloblands from Tivoli to Dunkettle. The chief advantages of this site were the railway line alongside, and the fact that the river, even after reclamation, would be wide enough at that point to allow ships of 600 or 700-ft. to swing from the proposed wharves. The Tivoli scheme was formally inaugurated in 1919, but delays followed, and it was not until 1925 that work was commenced on it. Since then reclamation has been proceeding steadily.

Apart from quay accommodation in the lower harbour and at other places, there is at Cork 8,900 linear feet of deep water quay accommodation and 5,300 feet of other quays, railway sidings being laid down to all the important points.

In regard to cranage facilites, Cork is well adapted to deal with heavy traffic. In addition to many hand cranes, there are seven electric transporters, including two at Ford's Wharf. The largest of these recently lifted a 23-ton boiler from the hold of a vessel and placed it on a trolley on the quay within a space of five minutes.

During the year ended July 31st last the port dealt with cargo vessels of a total net tonnage of 850,000; some 900,000 tons of goods were imported and 90,000 exported. The latter figure does not include cattle, exports of which amounted to 261,470 head. On a single day in September last 25,952 tons of shipping were accommodated at the Cork quays.

Tralee

Tralee Harbour Board.

Mr. Kelleher has been re-elected Chairman of the Tralee Harbour Board.

Waterford

Suggested New Development in Waterford.

At a meeting of the Waterford Quay and Pilot Committee, Mr. Austin A. Farrell, Secretary and General Manager, suggested the laying down of a new line of railway linking up with the old Dungarvan line. He suggests the extension of that line along the quays to the Great Western Railway wharf at the far end below the Mall, thereby linking up the Waterford-Fishguard Service with Cork, Kilkenny and Tipperary, and facilitating goods and passenger traffic across-channel from the Midlands through Waterford. Mr. Farrell believes that now, when the Rosslare-Fishguard and Rosslare-Waterford services are uneconomic, the time is opportune to launch his scheme for bringing increased trade to Waterford and eliminating the double handling of goods now necessary in consequence of the lack of a railway link with the G.W.R. depot. He believes that increased traffic would make the routes paying propositions, and stated that there is not sufficient volume of traffic for three lines of shipping from the South of Ireland to Fishguard. This scheme might lead to the abandonment of Rosslare by the G.W.R. and concentration on Waterford as the more central port with greater connection facilities for Munster and Leinster.

Galway

Galway as a Commercial Port.

Mr. M. J. Kennedy, County Surveyor, Galway, at a meeting of the Institution of Municipal and County Engineers, in Galway, declared that £200,000 was the estimated cost of a scheme which would afford facilities for the docking, discharging and loading of larger cargo boats than can now use Galway docks; accommodate fishing boats at all states of the tide, and in all weathers, and afford facilities at all states

Irish Harbour Matters—continued

The Port of Dublin: The North Quay Extension and 100-ton Crane.

of the tide to carry passengers to and from ocean-going liners. The establishment of a terminal port would come to fruition only when the great shipping interests in England, the Continent and America became convinced that the eugenics of fast ocean travel made such a port on the western seaboard a paramount requirement. Galway's future was intimately bound up in the development of the commercial harbour, and if present opportunities were let slip such favourable circumstances would not likely occur again, and Galway must remain a town of wasted possibilities.

In the discussion which followed doubt was expressed as to the possibility of raising the money required, though the importance of improving the port for commercial purposes was recognised. Professor Griffith, Galway University, did not think that the scheme for a terminal port at Furlough was practical at present. The commercial development of the port was practical.

Dublin

No Rats in Custom House Docks.

Arising out of a report from the Manager of the Custom House Docks, Mr. Bailey, Secretary of the Dublin Port and Docks Board, stated that the mongoose called into the service of the Board had done excellent work clearing out the rats as there was now no evidence of them in the Custom House docks and sheds. Subsequently the makers of a preparation for exterminating rats wrote claiming that the clearance was due to the use of their product.

Belfast

Belfast Harbour Affairs.

At a meeting of the Belfast Harbour Board on the 6th Oct. —Mr. R. E. Herdman, D.L., presiding—Captain McIntyre (Harbour Master) submitted his usual report, which showed that 426 vessels had arrived at the port between September 13th and October 3rd, made up as follows: Coastwise and cross-Channel, 385; foreign, 31; non-trading, 10. The tonnage figures for the period January 1st to October 3rd were: Coastwise and cross-Channel, 2,161,220, an increase of 15,036 compared with the corresponding period last year; foreign, 569,122, an increase of 21,210; non-trading, 67,750, a decrease of 35,486; total, 2,798,092, an increase of 760.

Applications concerning lying-up rates for vessels were read from the Belfast Shipbuilders' Association and from Messrs. Harland and Wolff. It was decided that the period during which vessels launched in the harbour and vessels arriving for fitting out are allowed to remain in the harbour before incurring lying-up rates be extended from four to eight weeks, as in the case of non-trading vessels.

A report from the Harbour Engineer intimated that during recent sweeping operations about four miles of steel wire rope were removed from the bed of Victoria Channel. A report from the Harbour Master on the subject suggested that a circular letter be issued to shipowners and masters for exhibition on board their vessels pointing out the loss, danger and inconvenience which may be caused by the deposit of disused wire ropes in the channel and docks of the harbour and intimating that the Commissioners were prepared to facilitate masters of vessels by accepting and removing any wire rope no longer required, if deposited on the quays. The Board approved of the Harbour Master's suggestion.

The General Manager reported that in view of the large amount of timber pond accommodation which will be absorbed in the new dock scheme and approach channel, he had considered with the Board's officers and representatives of the timber trade the question of providing alternative pondage to meet future requirements. He submitted plans showing a new pond, which he suggested should be formed for general public use on the west side of the approach channel to the new dock, immediately to the northward of the west quay of the new turning basin, by the provision of a hand crane and a slipway and the carrying out of a small amount of dredging. This was in accordance with the Board's intentions when the construction of the new approach channel was decided upon.

The Board recommended that the Consulting Engineer be authorised to carry out the work suggested.

Cutting Down Stettin Harbour Expenses.

As a result of the economic crisis the Stettin Harbour Board appointed a commission to investigate the expenditure of the Stettin Harbour Authorities and report on means for the curtailment of expenses.

The harbour is run jointly by the State and the Stettin Municipality, and the annual contributions towards the upkeep and management of the harbour amounted to 1,354,215 marks in 1929, 1,229,560 marks in 1930, and 678,000 marks in 1931.

The commission in question has proposed a reduction of expenses by the discharge of 15 per cent. of the harbour officials now employed, a reduction of wages paid to the harbour workmen, the centralisation of various harbour offices under one management and laying up of all motor-cars and motor-boats used hitherto by the harbour authorities. By these measures it is hoped to reduce the annual contributions towards the Stettin Harbour to about 450,000 marks.

Hull and the Humber

Shipment of Coal by means of Electric Coal Conveyor at the London and North-Eastern Railway Company's King George Dock, Hull.

Delay in the Humber Bridge Bill.

THE unexpected changes in the political situation have prevented the hearing of the Humber Bridge Bill by a House of Lords Select Committee as intended, but it has been arranged to carry the Bill over to the new Parliament. On behalf of the promoters, the Hull Corporation, it is pointed out that this is not understood to imply any intention to change the decision to proceed with the measure. No indication whatever has been given to the promoters that any difficulty will be placed in the way of their important project going forward. The promoters, however, are prepared to give, during the passage of the Bill through the Upper House, assurances that if the scheme receives the sanction of Parliament, the actual commencement of the work will be deferred until the Ministry intimates that the financial situation warrants such commencement. In the meantime further progress has been made in the negotiations with certain petitioners against the Bill with a view to disposing of their objections. The Humber Conservancy Board has been hopeful that the proposals would be withdrawn in view of the national emergency and had written the Board of Trade pointing out that if the Bill was to be proceeded with the Conservancy Commissioners must continue in opposition to it and so incur the expense of so doing; on the other hand if the Conservancy Board had an assurance that the Bill would be dropped, the costs of their further opposition would be saved. The matter is now held up until early in the New Year, when the struggle to protect the interests of the Navigation of the River Humber will be resumed.

Aire and Calder Navigation.

Incidentally it may be mentioned that part of the Conservancy Scheme for the construction of training walls at the confluence of the Ouse and the Trent is making good progress, the engineer to the Aire and Calder Navigation having reported that, unforeseen circumstances excepted, the whole of the Trent Falls improvement works would be completed within the period stipulated by the Act., viz., eight years from July, 1926. To these works the Humber Conservancy Commissioners are contributing a fixed sum.

Annual Meeting of Bridlington Harbour Commissioners.

At the annual meeting of the Bridlington (East Yorkshire) Harbour Commissioners presided over by Dr. T. C. Jackson, it was reported that the total income for the year was £1,258 13s. 9d. against £1,093 18s. in the previous period, and that the expenditure was £1,384 15s. 5d. (including £820 for repairs to the north pier) against £510 11s. The Chairman said that the Commissioners could congratulate themselves on having been able to meet out of revenue the unusual expenditure which extensive damage to the north pier had necessitated. The meeting also had under discussion the proposed scheme for a roadway across Bridlington Harbour to bridge the gap now separating the work and south promenades and sea walls. The scheme fathered by the Bridlington Town Council as originally prepared contained features to which the Harbour Commissioners strongly objected. After one or two Conferences the Commissioners have prepared a final report, the main proposals embracing one that Clough Hole shall be filled in, as was first suggested by the Town Council, and that to compensate for the lost water space the whole of the proposed roadway shall be removed back and a large part of the existing Langdale's wharf demolished. The Commissioners also suggest that four long jetties shall be built out into the Harbour from the new roadway to replace the "Chicken Run" which is to be demolished. An additional 780-ft. of mooring space will result. The construction of the roadway at the north end will mean the demolition of the harbour-master's house and the offices of the Commissioners, and it is proposed that new premises shall be erected on or near the site of the new Town Hall. Dr. T. C. Jackson was re-elected Chairman of the Commissioners.

Increase of Imports at Hull.

The Port of Hull has been fairly busy in recent weeks, there having been largely increased arrivals of wheat and kindred cereals, oil seeds, etc. So heavy have been the imports of grain, augmented by numerous cargoes from Russia, that the existing warehouse accommodation has been very severely taxed and appeals made for private owners to come forward with offers of storage room. The imports of sawn wood and pit props have also been extensive, but on rather a lesser scale than last year, when over a million loads came to hand during the twelve months. The volume of coal exported continues to be disappointing, the total for the three months ended September 30th from the Humber ports being only 1,012,984 tons, a decrease of 621,632 tons, as compared with the corresponding quarter of last year. The decrease for the nine months is 1,371,527 tons.

Embankments in Tidal Rivers and their Protection

General.

A STUDY of Babylonian and Egyptian history shows that these nations well understood the laws governing the improvement and maintenance of rivers, and it is to their efficient organisation of this work that much of their wealth and greatness was due. Sextus Julius Frontinus and Galileo were, of course, Romans, and from their experiments a good deal of the science of hydrodynamics is due.

Dominic Guglielmini, an inspector of rivers and canals in the Milanese in the seventeenth century, published the result of certain of his investigations on the question of damage caused by the repeated inability of the Italian rivers satisfactorily to deal with and discharge their contents in times of flood. As certain theories and facts which he enunciated and enumerated are relevant to the subject of erosion, some of them are here quoted. He found that—

(a) A stream, if not guided by artificial means, will assume a series of curves.
(b) When erosion once commences where the material forming the banks is softer than in other places, erosion will continue and a concavity will be formed.
(c) The deflection of the river caused by this action will cause erosion on the opposite bank, and a series of curves will then go on forming until the resistance of the banks becomes equal to the force of the stream and equilibrium is established.

That is to say, bends in a river are primarily due to the variation in composition of the material forming the banks and bed of the river or to obstructions met with by the stream in its course.

In a tidal river the action of the ebb tide accentuates the action of the land water of the stream, and erosion may also be caused by the flood tide.

River Training and Erosion.

The banks of rivers, tidal or otherwise, in their natural state as we find them to-day have probably more or less reached a degree of equilibrium during the many centuries of their existence, and it is only when a river has been improved, bridged, or deepened and otherwise modified for the purposes of navigation, drainage and so on, that the need for protection of its banks becomes greatly apparent. In this case the necessity for protecting the banks from erosion depends very much upon the method adopted for regulating the river, there being two main principles whereby a river can be regulated so as to improve the general depth. Many tidal rivers have been regulated by straightening the channel either by constructing longitudinal walls or "dykes" on each side below high tide level, or by actually constructing new embankments to flatten the bends or by new channels entirely, to eliminate the bends, the old channel being filled in and reclaimed.

The other principle of river regulation is that in which no attempt at straightening the course of the river is made. In this method the natural curves of the river are followed, the current being directed by training walls or by dredging so that it scours, and, if possible, maintains a navigable channel of the required depth. The improvement of the Brisbane River is an example of this principle of improvement applied to a tidal river, although certain points or acute angles in the river were also cut off. This work was commenced in 1897 upon a scheme evolved by Mr. E. A. Cullen.

This method, it is understood, was that also adopted by the Port of London Authority when that Authority was formed in 1908 to take over the docks of London and the River Thames. The writer is informed that to a great extent this method, coupled with the equalisation of the slopes by dredging and by utilising the flow of the stream for maintaining the depth by scour, has been entirely successful so far as the work has been completed, but it is early to say that the whole navigable channel of the tidal portion of the river is yet self-maintaining.

On the other hand, these methods have not always been attended with entire success, and at times such projects require most careful investigation, it being very difficult to forecast exactly the precise results.

Whatever method of river training and improvement is adopted and the banks are composed of alluvium, the alteration in direction and increase in speed of the river and tidal currents is almost bound to result in erosion of stretches of the banks, which must be covered with some material of a non-erodible character.

The banks and foreshores of the River Thames, with very few exceptions, show a tendency to erode throughout the tidal portion. This is probably not entirely due to the increased depth and scour attained by dredging and river training. Most probably much is attributable to increased traffic and the wash of vessels navigating at lower states of the tide, made possible by the increased depth, especially in the upper reaches.

Due to erosion of the foreshores, between low water and half-tide level, of the River Thames in the neighbourhood of Isleworth, many rough-hewn oak stakes about 3 to 4 feet long and 4 to 5 inches diameter have from time to time become uncovered. Some of the stakes have the remains of oak trenails in them. These have been pronounced by experts from the British Museum to be of Roman origin, probably being the remains of river bank protection of the time of Roman occupation of Britain.

It is not within the scope of this article to discuss the relative merits of the various methods of river improvement applied to specific cases; remarks will be confined to the construction of embankments and maintenance of river banks in tidal rivers, these works being described from a practical point of view.

As has been mentioned, rivers naturally have a tendency to erode their banks in their natural state, particularly during flood conditions or when some abnormal state of the river bed has occurred, say, a sunken vessel or an accumulation of sunken trees and brushwood, which in times of flood often fall into a river and roll along its bed until they come to rest where brushwood and other debris is collected, forming sometimes a formidable obstruction which, unlocated and unobserved, may cause a considerable alteration in current and erosion of banks.

In tidal rivers the tendency to erode is normally accentuated, particularly on the ebb tide. The protection of training works from erosion is, of course, most necessary on account of their usually being placed where directly affected by tidal currents. Besides the normal results attained—the protection of the bank or training work itself from erosion—its safety and that of property ashore being assured, a further benefit is secured, and by no means the least important, that is to say, the lessening of travelling sediment and therefore the reduction of deposit, silting and shoaling in the river bed.

Pure erosion of a river bank is normally caused by the centrifugal force of the current in passing a bend, the water being thrown against the bank. The reaction set up by its being checked causes a boring effect, which in soft material quickly erodes it, carries away the light material at the water line until the bank becomes under-cut, when sooner or later masses of material fall into the stream and are eventually carried away, the process repeating itself. The breaking away of the earth banks is usually most in evidence in wet weather, or when a flood has saturated the earth behind. In tidal rivers, where high water flows over the top of the bank, a flood condition is obtained at every high water, and erosion in tidal rivers where the banks are insufficiently high is increased enormously.

Another cause of erosion of banks is the wash of water caused by navigation of the stream by craft; the larger and faster the craft and the narrower the river the more rapid is the erosion. In exposed situations in wide rivers and estuaries the action of waves is a further frequent cause of erosion. In non-tidal waters this caving of the banks is usually confined to one zone of more or less small dimensions, and it is only necessary in order to secure immunity from erosion to protect this area from the action of the flowing stream. In tidal rivers, however, the sphere of action of the eroding current may well be at all points between high and low water, and the area to be protected is necessarily likely to be greatly increased, although the main erosion is usually to be found at one definite level.

The regulation and training of rivers by means of walls and dykes has been mentioned, and it should be remembered that much the same effects can be produced in a river by jetties and the like structures erected by commercial firms. Much alteration in the tidal flow can be effected which may be deleterious unless this aspect of the case is carefully considered by the authority having jurisdiction over the conservancy of the river, and action taken accordingly. On the other hand, the presence of jetties and the like may be the means of prevention of erosion of bank and foreshores by a diversion or retardation of current. The writer is aware of two such instances. In one case the removal of a commercially owned jetty on the concave side of a river undoubtedly was the cause of considerable erosion of the foreshore and footings of the river wall in the vicinity, while in the other case similar results were noticed due to the removal of a stone causeway which projected into the tideway, and which had had during its existence the effect of a groyne.

Methods of Protection of Banks.

The obvious method of preventing scour of an erodible bank is to cover it with some non-erodible material, and this is the method adopted: The covering usually selected is stone, which must be in sufficiently large pieces to withstand the current, and must be of a type which resists frost. It must also be laid in such a manner as to be free from interstices, through which scour might take place. Owing to differences in level of tidal

Embankments in Tidal Rivers and their Protection—continued

rivers, the different parts of the bank are subjected to different conditions. Below low water level, if erosion is present here, the method of protection is necessarily different from that adopted between low water and high water and the top of the bank, owing to its inaccessibility.

Above low water level a properly laid stone covering or pitched slope forms an efficient covering. Below low water level it is of course not possible to lay a stone covering in the same manner as can be done above this level, and to ensure a sound and efficient protection for the bank a stable foundation must be secured, the material forming it being of a heavy nature and non-perishable.

In many situations, where the toe of the bank is below low water, it is only necessary to dump stone into the river at the foot of the bank and allow it to assume its own natural slope, more material being added until the mass appears to have formed a stable slope. If the bed of the river is composed of either very soft unstable material or is, say, compact ballast, in either case a trench dredged out, into which the stones forming the toe of the bank will drop, will prevent subsequent forward movement of the stones and thus secure the bank against future subsidence. If the river is showing signs of scouring its bed such a trench to form a toe for the stonework is very essential.

When so constructed they are usually loaded or covered with stone, both as a means of sinking them in place and as subsequent protection.

Fig. No. 1 shows a typical facine mattress construction.

Facine mattresses as employed in America are of great size, sometimes 300-ft. by 1,200-ft. In this country the bindings are invariably composed of galvanised iron wire or silicon bronze wire to resist corrosion. In the English Fen district rivers and canals the facine mattresses are loaded with clay about a foot thick. In the comparatively narrow channels this material has the special advantage of not causing damage to vessels colliding with the banks, or sustaining much damage itself thereby. In America and most other countries the use of facine construction and brushwood above low water level has been largely discontinued.

Sheet piling driven down to low water level with a horizontal top waling is another very efficient but most expensive method of preventing undermining of a river bank below low water line. This method provides a firm and secure foundation upon which to build the pitched slope above. This would be adopted where the placing of mattresses or rubble stone might prove a danger to small vessels navigating close inshore at low states of the tide.

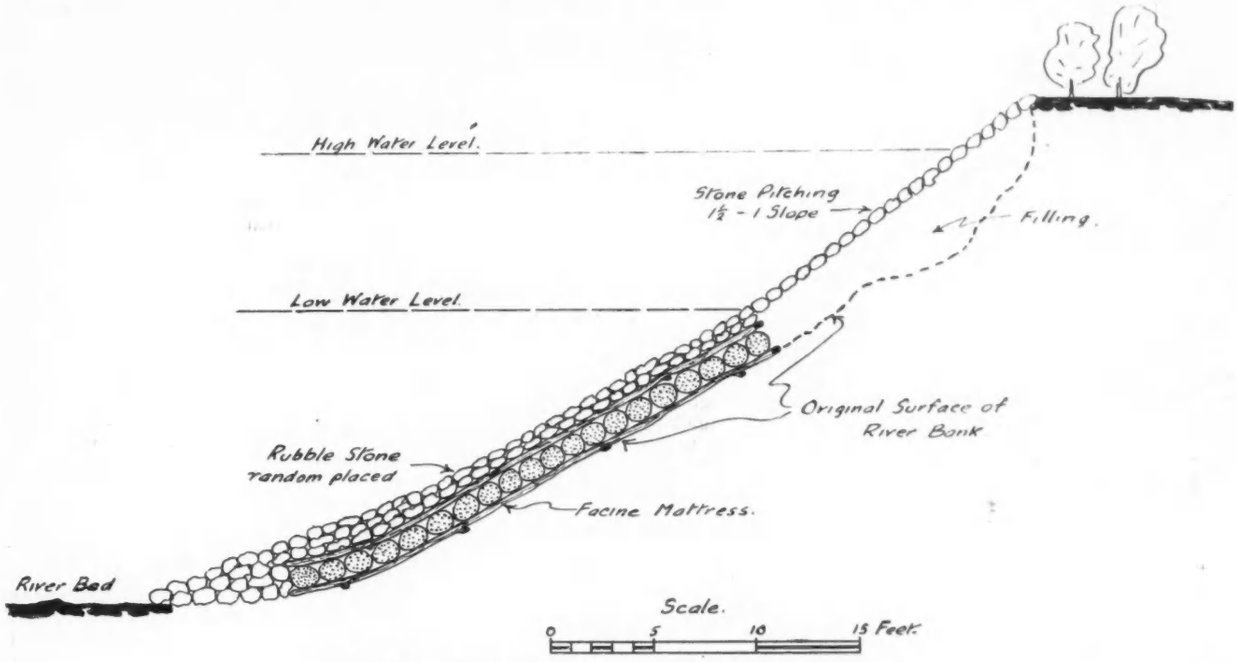


Fig. 1. Typical Facine Mattress Bank Protection Work.

In other cases facine aprons or mattresses formed of brushwood have been used. The application of brushwood for the construction of " dykes " and embankments is one of the oldest methods. Evidences of this type of construction are existent in Holland and in this country in the Fens and on the Thames, where it was used in bank construction many centuries ago by the Dutch, when such work was being undertaken by them here for the reclamation of marsh lands. This method of construction is still largely employed in Holland and on American rivers, where the necessary materials grow in profusion, and are therefore relatively cheap.

In fact, in Holland brushwood shrubs, especially willow and alder, are extensively cultivated, for this country largely owes its very existence to the construction and maintenance of the dykes and mounds as defences against the inroads of the sea and rivers.

Brushwood construction is employed most profitably below low water; between low water mark and high water mark it decays very quickly and its life is short. Below low water, however, where it is always submerged by water, its duration is remarkable, as is proved by the examination of brushwood constructions removed after a long period of years. The various forms of brushwood bank protection are innumerable, the main varieties being facines, facine mattresses and mattresess of various other forms.

Facines are bundles of branches and twigs from 9-in. to 1-ft. 6-in. in diameter of various lengths bound together with wires, tarred rope, or lengths of flexible willow. These are laid side by side and secured by short piles driven into the bank. Facines by themselves cannot very well be laid below water line, and so the facines or bundles of flexible branches are secured together to form facine mattresses.

The grading or slope of the bank requires careful consideration. Before attempting to protect it a slope somewhat less than the natural slope of the material composing the bank is usually adopted. Most usual slopes are from 1½ to 1, to 3 to 1. A river bank being merely a mass of earth, there is a critical or natural slope which, if exceeded, it will be in an unstable condition and liable to subside, bulge or slide into the river. This slope naturally depends mainly upon the character of the material forming the bank and its degree of saturation with water. As to whether the bank is composed of recently placed material, or whether an old-established bank is merely trued up before the covering is placed, will also affect consideration of the best angle to adopt for the finished slope. Banks subject to overflow are at such periods in a state of saturation, and all calculations for securing a permanent slope must be based upon such condition of saturation.

Seepage of water from the rear of the bank is a further condition to be dealt with, and a much less slope than would otherwise be adopted will sometimes be advisable. Possibly means of providing free escape for land water seepage must also be adopted. Seepage can be caused in two distinct ways, and a large amount of trouble with river banks can be traced to seepage from these two causes.

The natural banks of a river are generally composed of layers of clay, gravel and sand. At high water there is a considerable pressure of water on the face of the bank, and the gravel and sand, being pervious, admit water, so that these strata become saturated with water to a considerable distance behind. When the tide falls this water percolates back into the stream and carries the finer material with it, even though the bank may have been carefully pitched with stone. This process, going on time after time for years, eventually the bank sinks, tends to

Embankments in Tidal Rivers and their Protection—continued

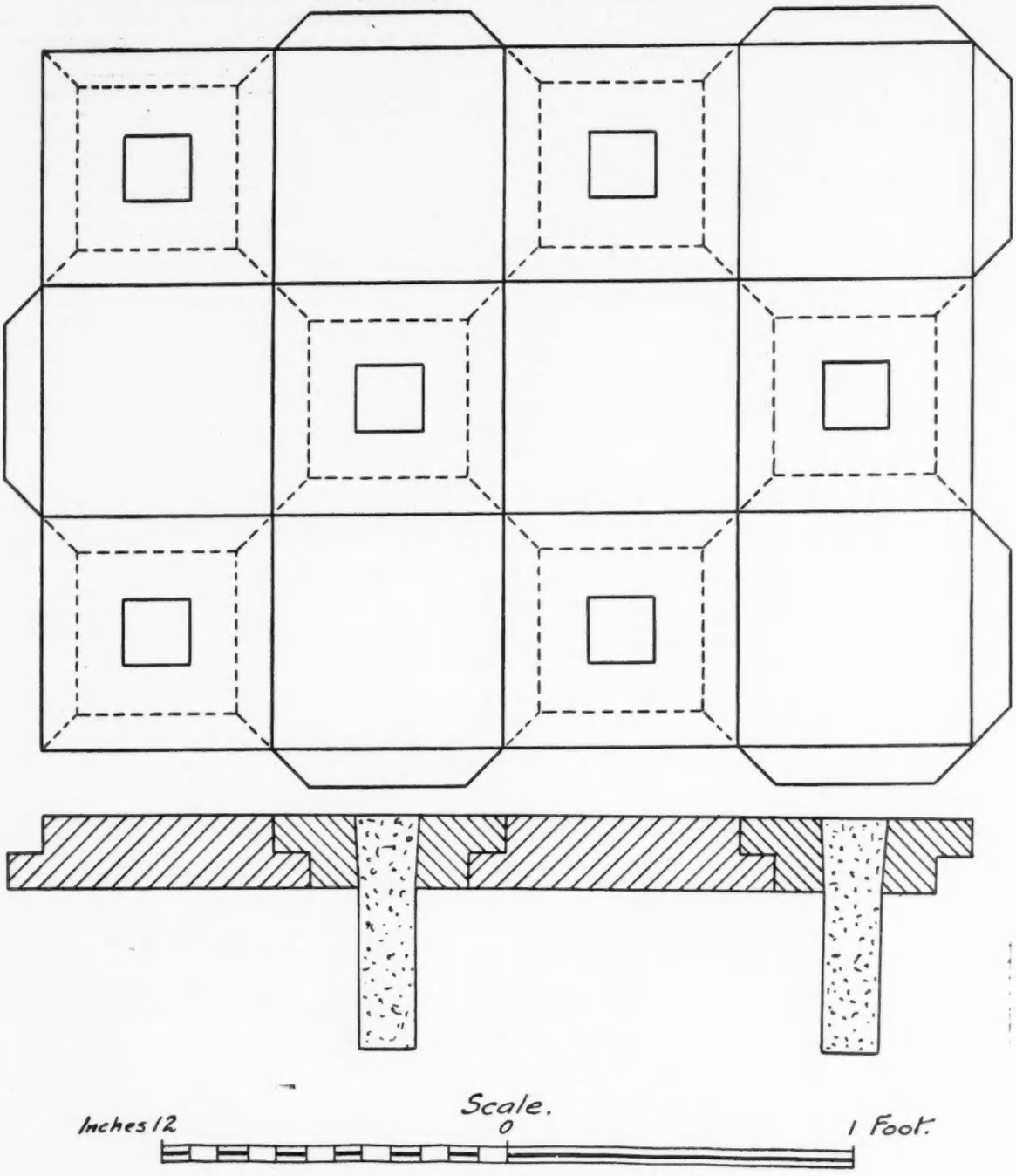


Fig. 2. Concrete Slab Shore Protection.

flatten out, and ultimately the top portion, deprived of its support, either bulges or otherwise collapses.

The other form of seepage is that in which the same results are present, but due to spring waters or percolation of surface water. The type of protection adopted for the prevention of erosion of river banks will again depend upon the cost of materials and the regimen of the river. Where the river is deep and the current swift, and there is no foreshore at low water, the works will be costly on account of their being of necessity a good deal of under waterwork. On the other hand, the banks of streams of moderate current with a foreshore dry at low water can be protected at small cost and with very little subsequent maintenance charges. Where stone is procurable at reasonable rates it should be used. It is permanent and usually gives satisfactory results.

In slow moving rivers the surface of banks above high water ordinary spring tides are often merely covered with sods; in other cases there is a thin layer of stone between low water and high water, with willows planted in the interstices which counteract the more deleterious effects of floods. In order to keep the willows in bush form it is necessary to cut them down frequently so that they continually throw out long shoots.

Small piles of timber are frequently met with in connection with stone pitching, their object being to prevent the stone from slipping downwards. If well driven down they also tend to hold the bank material together. These small piles are seen in large quantities in the River Thames, particularly in the lower reaches, and in this case are probably many hundreds of years old, judging by the condition of the natural oak timber of which they are composed. They are known on the Thames as " Farmer's Teeth."

A form of river bank protection which has proved wonderfully efficacious and cheap in small rivers is that known as " Wattling "—small posts of green timber driven into the ground and intertwined with brushwood, forming a sort of basket work, the back being filled in with earth.

Timber, if used for river bank work, should be so placed as to be submerged by the water as far as practicable, otherwise it should be employed only in situations where it can be readily seen, inspected and repaired.

The use of cement mortar for cementing together the stones forming a pitched slope is deprecated by those in charge of the artificial protective banks on the River Thames below London, the reason being that there is great possibility of the earth below the pitching stones being removed by rats, of which there are in many places large quantities, or by seepage or sinkage of the banks, when large areas of stone, if cemented together, would " hang up " until they suddenly collapsed,

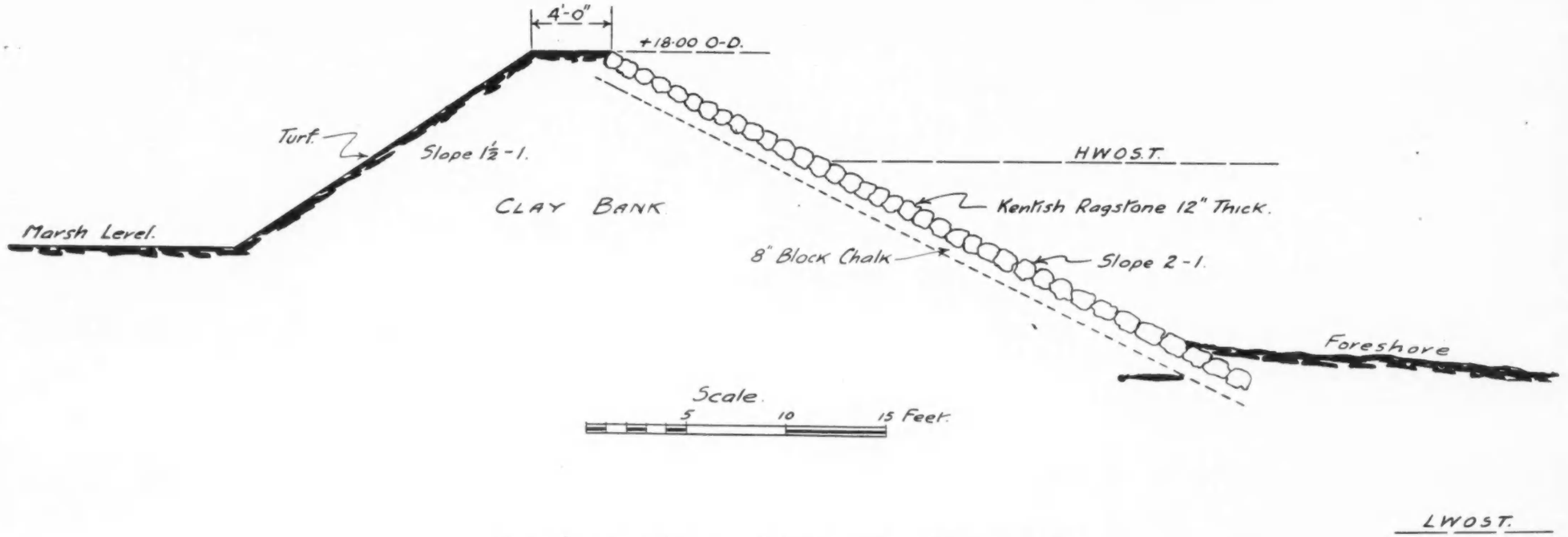


Fig. 3. Type of Embankment Wall and Protection in Thames Estuary.

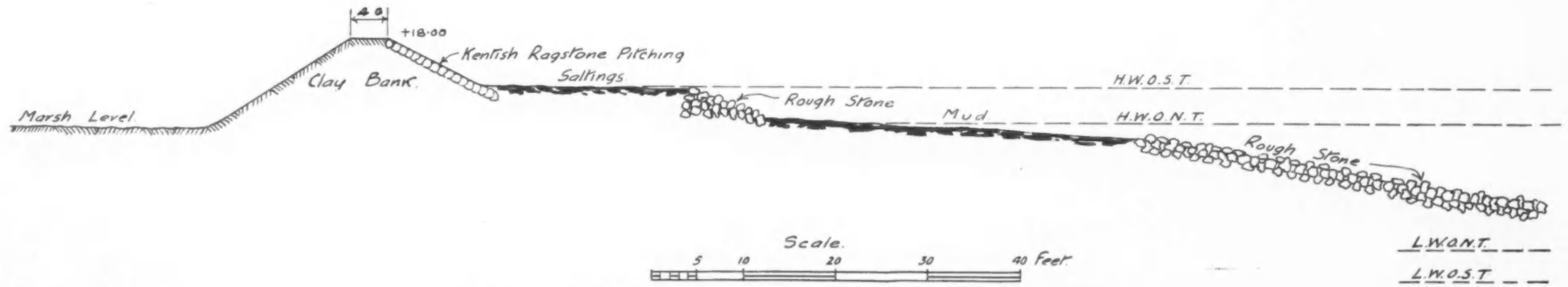


Fig. 4. Typical River Embankment Wall, Foreshore and Saltings Protection.

Embankments in Tidal Rivers and their Protection—continued

leaving the earth bank greatly weakened and in danger of rapid erosion. These banks referred to are not of large dimensions, and high tides and waves in exposed places with the bank in such a condition might have serious consequences, especially if such a condition remained undetected for any length of time in stormy weather. Uncemented stones, of course, tend to follow any sinkage of the ground and indicate what is going on beneath.

In " The Improvement of Rivers (Part I) " Messrs. Thomas and Watt say: " Solidification of a mass of stone pitching by mortar may permit a large area of earth underneath to give way before failure, and thus there may occur, without warning, a breach of considerable dimensions and one which may be left unprotected or be even unknown during lengthened periods of high water."

The following is a brief description of training walls and bank revetments executed in Brisbane River (Australia) :—

At various times in the period 1895 to 1920 training walls in a scheme of improvement of the river were built. These walls had a top width of 4-ft., the outer slope being 1¼ to 1, built of rough stones easily man-handled. The line of the wall was marked out by piles at about 150-ft. centres, and the stone was thrown out by hand from barges and roughly trimmed to the required slope. Where a wall crossed a sand bank dry at low water—the Hamilton Wall—a trench from 6 to 8-ft. deep was dredged through the sand to receive the stone. In the case of another wall—from Cosen Point to Parker Island—the site of the wall was found to be too soft over the lower length to carry the stone, and a system of mattresses was therefore adopted.

to any slight settlement of the bank. In this type of covering the bank is entirely protected from wave wash and the inroads of rats, there being no interstices whatever.

The use of precast concrete keys has been largely discontinued, the heads having a tendency to break off; instead, a hole is worked in the clay bank, which is filled with fine concrete. De Muralt has also employed concrete mattresses in lieu of the more usual type of brushwood facine mattress, precast concrete slabs 3-ft. square and 5-in. thick being used. The slabs are laid out over a low water flat or beach, secured together with iron links. A pontoon is then floated over at high water, and by cables and winches the entire mattress is carefully lifted without distortion, the pontoon being then moved away to the site of the protection work, where the mattress is lowered into position.

Messrs. Thomas and Watt, in " The Improvement of Rivers (Part I)," describe a form of bank protection which is interesting and has been largely adopted:—

" About 1890 a type of protection was introduced in Italy composed of blocks of terra-cotta or concrete, strung on wires. It has since been used on the Po, the Nile, the Dee and other rivers, and is reported to have given satisfaction. The blocks are about 10-in. wide and 4-in. thick, and weigh from 25 to 30 pounds apiece. The wires are galvanised or covered with lead or made of non-rusting metal, and are attached at intervals of about 6-ft. to an anchor pile buried in the bank. This style of covering is laid by means of a floating scaffold and a special winch in elements of from 15 to 30-ft. in width, each element being continuous with the one adjoining, and the up and down stream extremities are protected with facines or rip-rap."

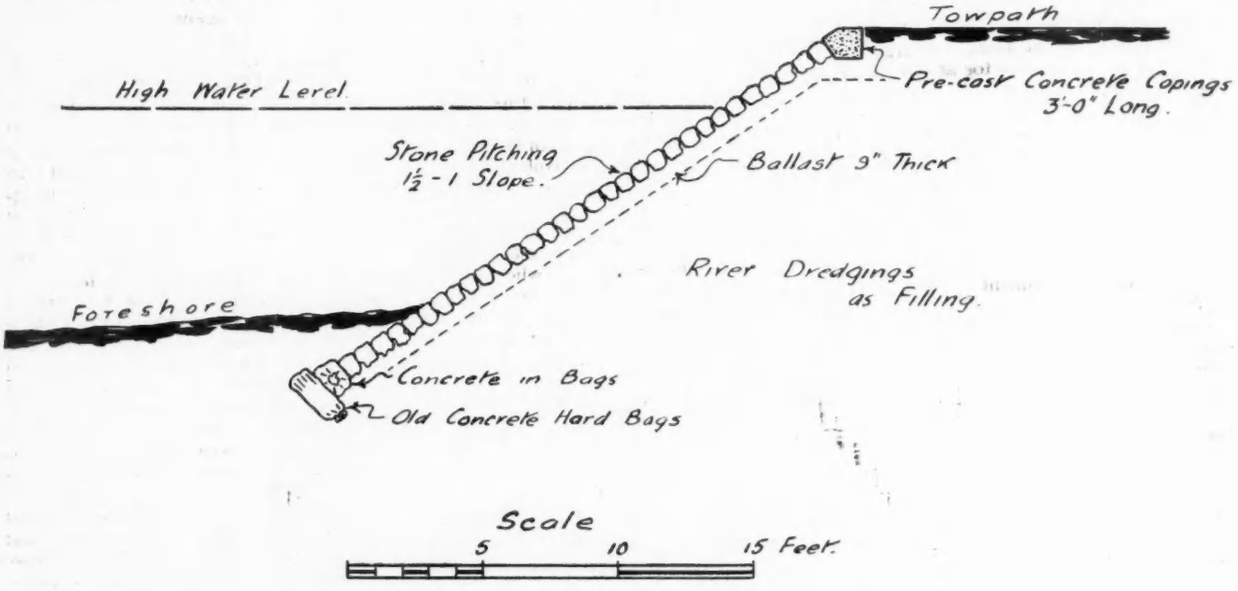


Fig. 5. River Embankment Wall in Upper Reaches of River Thames.

A length of 1,250-ft. accordingly consists of brushwood mattresses up to low water level, covered with sand by a suction dredger and then covered with stone up to a height of 2-ft. above the highest spring tides. Due to the large increase in river traffic owing to the improvements effected in the river, a large portion of the river banks which consisted of alluvium were subjected to accelerated erosion, and it was very necessary to arrest it. This was carried out by building up slopes of stone on the beach or foreshore with a roughly trimmed outer slope of 1¼ to 1, the alignment being faired up as the work proceeded. It is stated that 13,630 lineal yards of river bank were effectively protected at a cost of £17,847, and that the volume of stone was 87,000 tons. (Min. Proc. I.C.E. Vol. CCXIV.).

Fig. No. 2 shows a system of bank protection evolved by De Muralt, now largely in use in Holland. In Great Britain it has also been adopted with great success.

The system consists of covering the slope of the bank, which should not have an inclination greater than 30 degrees, with concrete slabs. The precast concrete slabs in the example are 2½-in. thick and 8-in. square, but are sometimes larger—16-in. square or more. Alternate slabs have flanges and rebates which fit into each other; those without flanges have square taper holes in the centre through which are driven long reinforced concrete keys, which hold them and the neighbouring slabs firmly to the bank. The slope may have a graded surface of clay or chalk upon which the slabs are laid, or if particularly unstable may be faced with, firstly, facine work, straw, etc.

The benefit derived from this system, like that of the Italian method mentioned later, is that the covering accommodates itself

Illustration No. 3 shows the type of river wall and its protection in use in the lower reaches of the River Thames and estuary. These river walls are of the first importance, as the safety of the whole of the low-lying marsh land inland depends upon them. The walls are of clay, the river face being constructed with a slope of 2:1, while the land face is 1½:1. The former is faced with Kentish ragstone, which is cheap and obtainable locally, laid upon a bed of block chalk. The chalk, however, is not always insisted upon. It has been found better for the pitching to extend to the top of the bank, but in many places it only reaches to a foot so so above the level of high water of spring tides, and is likewise not always insisted upon.

Maintenance costs of these walls and their protective covering are not large, most repair being needed where the land at the back is used for cattle grazing. The cattle and sheep in the heat of the summer climb the bank and use the top of the wall as a means of getting cool air and to blow away the troublesome flies. Much wear is thus occasioned to the back slope and top, especially after rain. After a drought the walls, being of clay, have a tendency to crack and fissures form; October and November have therefore been found to be the best months for effecting repairs. Clay for making up the back slope and top is obtained from borrow pits in the marshes, but none is procured nearer than 30-ft. from the toe of the slope.

As the sea is approached in the Thames estuary, some trouble is experienced with seaweed, which grows upon the stones situated in the zone around low water mark, and for some distance upwards. The seaweed increases the buoyancy of the stones, and wave action causes them to move and become dis-

Embankments in Tidal Rivers and their Protection—continued

placed. The only cure seems to be the use of stone, in the situation likely to be affected by this case, of large dimensions.

In many places in the lower reaches of the Thames are what are known as " saltings "—otherwise deposits—the top of which roughly coincide with high water level. Where the river is wide the toe of these saltings is protected by stone, which is roughly dumped into position from sailing barges at high tide. Where this type of work is possible it forms a cheap method of protection from erosion, and minimises the more expensive work of repairing and deepening the stone pitching of the actual river or flood prevention wall behind.

In the same way the foreshore, where erosion is present, is sometimes protected by dumped stone. A typical example of this type of work is shown in Fig. No. 4.

Illustration No. 5 shows the type of river embankment wall adopted by the Thames Conservancy and their successors, the Port of London Authority, in the tidal portion of the Thames above Putney. Much of the work has been carried out with Kentish ragstone, about 12-in. by 6-in. by 8-in. average size, laid with the 8-in. downwards. The " hard bags " shown at the bottom of the foundation are bags of concrete recovered from old dilapidated bank protection work superseded in the construction of the new embankments. The copings are precast concrete 6—1, cast in moulds on the site, placed in position and jointed in cement mortar. The two or three courses of stone below the copings are grouted up in cement mortar.

Several miles of this type of embankment have lately been constructed by the Port of London Authority with old granite sett paving stones from old roads in the docks. These setts are mainly 12-in. by 6-in. by 8-in., and have formed a very excellent stone facing. Ballast and clay mixed is always used below the stone pitching; it was found unsatisfactory to place the stones directly upon the clay dredged from the river, the material with which the embankment filling was largely composed.

In situations where the toe of the bank is inaccessible and a foundation built of stone and concrete is difficult to construct, camp-sheeting has been resorted to, and when kept below the normal water level has been found to be extremely durable; moreover, when driven to a good depth such construction has proved eminently satisfactory where undue erosion of the river bed has had to be contended with.

Messrs. Thomas and Watts describe the following method of bank protection on the Volga :—

" On this river, which resembles the Mississippi River in size but is of a more tranquil regimen, bank protection has been widely applied, as the banks in many places consist of fine sand and are easily eroded. The chief method used consists in grading the slope, hollows being first filled with brush with stakes driven about 3½-ft. apart, their tops projecting 2-ft. above ground. The brush is then wattled about them so as to make a series of hurdle fences, the spaces between being filled with rip-rap level with the tops of the stakes. Where the ground is of very untrustworthy material a thick layer of straw is first placed upon it. Facine mattresses 2-ft. thick are used to extend the protection below water line, but their width rarely exceeds 50-ft.

" All work above low water is usually laid on gravel or ballast, which is not less than 6-in. in thickness. If this gravel is omitted the soil is washed out and cavities form. In Holland clay is used for this purpose, about a foot thick, placed on the graded banks, which similarly are usually of sand. The clay is then covered with straw, and a paving of stone or concrete slabs laid with close joints.

" On the Manchester Ship Canal one of the most successful methods of protecting the banks was that of heavy limestone rip-rap roughly trimmed so as to pack closely, and laid directly upon the graded bank to a slope of 1 to 1 to 2 to 1, the latter slope being used where the banks showed a tendency to slide. The protection was carried up from the bottom of the canal to the top, and has been found satisfactory, with but little maintenance charges.

" Another method was to drive short piles at the edge of the water from 2 to 3-ft. centre to centre, joined by walings. On each side of the walings was placed a toe of rough stone below water and supporting the protection of the bank, which consisted of a layer of limestone 9-in. thick laid on the earth closely packed by hand. This method has also been proved entirely satisfactory."

Failure of Embankments due to Seepage of Water.

The writer has had experience of damage to river banks in a tidal river caused by seepage of water through the banks. One case, where the seepage was due to saturation of the strata behind the river bank by the rising tide, the pitching over considerable lengths caved inwards, and was dealt with by removing the pitching and digging out the fine gravel and sand below, with which the bank had been composed, and placing a layer of dredged clay some 18-in. thick from the foot of the bank to the coping, and then replacing the pitching laid on a 9-in. thick bed of mixed ballast and clay. This method effectively dealt with the trouble, and no further evidence of its occurrence has been noticed, although it is several years since the work was completed. This bank had a slope of 1½ to 1, and was about 25-ft. from coping to river foreshore level below which the bank foundations were some 3-ft. deep.

Another case where the seepage was due to water entering the river from behind, was more difficult to deal with. The bank in this instance had a slope of 1¼ to 1, and was composed of mixed material, mostly a mixture of clay and ballast dredged up from the river, the source of the water percolating through the bank being a reservoir situated some 60-ft. at the back of the bank, the level of the surface of the reservoir water being about two or three feet above the level of the top of the river bank. The results of this seepage was found to be not so much loss of material, but too steep a slope for the saturated material, which when dug out had the consistency of viscuous mud.

The result of the seepage was a falling in of the pitched surface at the upper part of the slope while great bulges appeared in the lower part of the slope, some slowly developing over a period of time while others suddenly bulged and collapsed outwards during the period of low water. One method of dealing with the trouble was to place 3-in. earthenware drain pipes along the toe of the bank and at about one-third of the way up the slope and about 10-ft. apart. This method was unsuccessful and the matter had to be reconsidered.

The method finally adopted was to reduce the slope to something about 1¾ to 1, and after digging out the viscuous mud to replace it with ballast, upon which the pitching stones were then laid. These were grouted in with cement mortar up to about one-third of the slope, while the 3-in. drain pipes were laid in the bank just above the foreshore level. This method has proved successful.

The Port of Hamburg

Discharging Bananas with the Aid of Conveyor Belts.

Since the early part of this summer shipment consisting of from 20,000 to 40,000 bundles of unpacked bananas each have arrived in the Port of Hamburg at intervals of three or four weeks, the country of origin being the Cameroons. They are intended partly for Hamburg itself, but partly also for Berlin, Saxony, Silesia, the Baltic countries, Sweden and Denmark. Up to quite recently they were discharged in cushioned packing cases; but this method, in spite of the great care exercised, was not found quite satisfactory, because bananas are apt to spoil when they are exposed to draughts or to temperatures below 11 degs. C. Moreover, bananas packed in cases in the ship's hold are subjected to a certain amount of pressure, which also tends to deteriorate their quality.

In Rotterdam and Bremerhaven banana shipments are transferred from the ship to the railroad truck by elevators and conveyor belts; and such an installation, suitable for four ship's hatches, has now also been supplied to the Port of Hamburg at the instance of the Committee for Trade, Shipping and Industrie, Division II. (Harbour Matters). The plant is up-to-date throughout and was first used a few days ago when 38,000 bundles of bananas ex s.s. " Puma," of the shipping firm of F. Laeisz G.m.b.H., were discharged at Pier Shed No. 48. It consists of four equal combinations of elevators and three conveyor belts each, which extend right across the heatable shed and on to the railroad truck to which the consignments are to be conveyed. All the way from the ship's hold to the pier shed the elevators are protected from draught by means of canvas wrappings. Inside the shed the bananas can be sorted according to their size and the degree of ripeness.

The number of bundles that can be handled by each conveyor plant is about 1,500 per hour. In order to accelerate the transhipment work as much as possible, the clearance at the custom-house is effected in the shed. The railroad authorities take charge of the consignments as soon as they have reached the trucks and see to it that they are immediately forwarded to their respective destinations.

The advantages of the new plant are, first, that the unpacked bananas are protected against shocks and pressure and against adverse climatic effects and, second, that the process of discharging them, including their re-loading, is accelerated as much as possible. The plant is a valuable addition to the mechanical equipment of the Port of Hamburg and satisfies a long-felt wish on the part of all those connected with the Hamburg fruit trade.

Public Works, Roads and Transport Exhibition

The following is a Detailed List of some of the Exhibits which will be on Show at the Royal Agricultural Hall, London, from November 16th to 21st, 1931

THE BRITISH STEEL PILING CO., LTD.,
54a, Parliament Street, S.W.1. Stand 57.

Details of this firm's exhibits were given in our issue for October 1931, on page 381.

THE CONSOLIDATED PNEUMATIC TOOL CO., LTD.,
170, Piccadilly, London, W.1.,

are showing Portable Plants of various sizes to meet all requirements.

CP-116 Road Breaking and Demolition Tools. This tool can be easily converted into a Pile Driver or Clay Digger for heavy excavations.

The No. 3 Clay Digger for ordinary trench, tunnelling and such like work.

CP-116 Pile or Sheeting Driver.

CP Tampers for back-filling trenches. No subsidence follows the use of these tampers.

The Quimby Sump Pump for pumping out manholes, trenches, etc., of surplus water.

Boyer Riveting Hammers for riveting steel frame buildings.

Boyer Chipping and Caulking Hammers, also for stone carving, sealing and paint scraping.

Pneumatic Rotary Surfacer for smoothing and finishing concrete, eliminating form marks, polishing marble, etc.

Little Giant and CP Rotary Drills and Grinders.

Cement Gun for injecting liquid cement or concrete into walls, foundations, etc.

All accessories suitable for the complete equipment of the Modern Public Works Contractor and Municipal Authorities, excavating and road making plants.

The Company's main works are situated at Fraserburgh, Scotland.

THE GAS ACCUMULATOR COMPANY (U.K.), LTD.,
Brentford—Stand 123, Gallery,

are exhibiting the AGA Road Beacons.

A Light Signal exhibited for the guidance of traffic on the road must above all else be reliable. In addition it must convey a readily understood and compelling signal-characteristic.

These conditions are wholly met by the inclusion in AGA Road Beacon equipment of lighting apparatus identical with that constituting the AGA Automatic Marine Lighthouse system which is in the service of all the principal Port Authorities throughout the world.

The original Road Beacon in this country was supplied to the Kent County Council in 1913 and to-day these beacons have been adopted by Authorities throughout the country.

The Road Department of the Ministry of Transport, having observed the elimination of accidents at busy intersections on main roads where AGA Road Beacons have been placed in service, has agreed to share equally with the Road Authority concerned, the cost of their installation and maintenance in approved positions.

An AGA Road Beacon

The Beacon can be placed on the highway and its position altered, if desired, without disturbing the surface of the road.

The RB/5 is a gas operated beacon and is equipped with a cylinder of Dissolved Acetylene gas sufficient to maintain the light in continuous day and night operation for a period of six months, the beacon during this time working entirely automatically and completely unattended.

The Company undertake to maintain the beacons for an extremely small annual cost.

The RB/E is an electrically equipped beacon designed to operate off the street mains and is for use in the vicinity of towns.

Both the above give a flashing red signal which is both unmistakable and demands attention.

A cinematograph film will be shown on the stand demonstrating the utility of the beacons when in service.

INGERSOLL-RAND COMPANY, LTD.,
165, Queen Victoria Street, London, E.C.4—Stand 34—

will be showing a wide range of equipment for road breaking, tunnelling, quarrying, general demolition and garage work. Some of the machines shown will be of Canadian manufacture, made in the works of the Canadian Ingersoll-Rand Co., Ltd., at Sherbrooke, Quebec.

For contracting and demolition work there will be a standard 5½-in. by 5-in. Type portable Air Compressor. For operation from this unit there are Paving Breakers, Trench Diggers, Jackhammers, Backfill Rammers, Pile Drivers and Hoists. Many of these are of new design.

For quarrying and tunnelling work there is shown a wide range of rock drills, hand held, column and tripod mounted. These include new "Jackhammers," drifters and sinkers. Several sizes of pneumatic picks and diggers are also exhibited. A No. 40 Leyner Rock Drill Steel Sharpener for making up and resharpening drill steels will be shown, together with a 6-F Oil Furnace for heating the steels.

An entirely new hoist will be exhibited for the first time. This is a double drum electric Hoist designed for hoisting and pulling as well as for scraping work, and is available in a range of sizes from seven to thirty-five horse-power. The hoist has a steel housing which fully protects drums, clutches and brakes. There is an internal expanding clutch for each drum operated by a single lever, thus preventing the possibility of engaging both clutches at once. The main gears are of helical type and the entire hoist is mounted on steel skids. Single drum hoists of the same type are also available.

In addition to this equipment, a wide range of pneumatic tools will also be shown. These include several sizes each of metal and wood drills, hoists, chipping, rivetting and scaling hammers, grinders, saws, diggers, picks, rammers and wire brushes.

LANGLEY LONDON LIMITED and THE COURTRAI-DU NORD TILE COMPANY LIMITED,
161, Borough High Street, London S.E.1. Stand 14, Row B.

The display consists of Roofing Tiles of various shapes in a great variety of Coloured and Glazed finishes.

Amongst others are the well-known Courtrai-Du Nord Roofing Tiles and Beauvais Tiles which have been used extensively for Local Authority Housing Schemes in all parts of the United Kingdom.

There are also Langley's Interlocking Improved Pantiles and Cloister Tiles, glazed in three different shades of green and many other colours, which are particularly suitable for buildings of a public or semi-public nature, such as Schools, Libraries, Welfare Centres, etc.

Colour is to the forefront of their programme and there is no doubt that roofs of colour are becoming more and more popular in this Country.

All of the Tiles mentioned are very moderately priced, even in the beautiful glazed colours.

In addition to Roofing Tiles, there will be a display of "Stelcon" Steel Clad Porphyry Concrete Flags and "Stelcon" Anchor Steel Plates, which are specially manufactured for floors where there is heavy wear and tear.

Langley's have a world-wide sale for these products, and claim that "Stelcon" will do what no other flooring material will do.

THE LINER CONCRETE MACHINERY CO.,
Newcastle-upon-Tyne,

will be showing an entirely new departure in Loading Hopper Concrete Mixers.

The "Liner-Ram" Tilting Drum Concrete Mixer (Patent applied for).

This machine is of a most novel type, because the loading hopper is operated by an hydraulic ram, thus cutting out wire ropes, pulleys, clutches, etc.

Public Works, Roads and Transport Exhibition—continued

The loading hopper rises at great speed, has a vibratory action at the top of its stroke which ensures a clean and rapid discharge into the mixing drum, and returns smoothly to the ground under its own weight without breaking.

At present made in 2 sizes, 7/5 and 10/7, one or both of which will be exhibited.

There is not a single chain, wire rope, pulley or clutch on this machine.

The " Liner " Improved Tilting Drum Concrete Mixer Without Loading Hopper.

The 7/5 size will be exhibited. All " Liner " Mixers run in ball-bearings throughout, are direct-driven and grease gun lubricated.

The " Liner-Junior " Tilting Drum Concrete Mixer 5/3½ Size.

Direct driven by 1½ h.p. " Lister " Petrol Engine. This machine has only been on the market 12 months, and is already a great favourite among the smaller builders and contractors. Extremely good value for money.

The " Liner " Patent Roller-Pan Mixer.

This machine is made in six sizes, i.e., with 2-ft. 10-in., 3-ft. 6-in., 4-ft. 6-in., 5-ft. 6-in., 6-ft. 3-in. and 7-ft. 6-in. diameter pans. The 3-ft. 6-in. and 4-ft. 6-in. sizes are being exhibited.

Unequalled for mixing sand-lime mortar, sand-cement mortar, haired-plaster, compo, semi-plastic concrete. Will crush and mix clinker for concrete blocks in one operation.

The " Liner " Concrete Vibrating Machine.

The ideal machine for the rapid consolidation of concrete flags, kerbs, fence-posts, etc. The 5-ft. x 3-ft. size direct-driven by 3 h.p. " Lister " Petrol Engine will be shown. In use in many of the largest Pre-cast Concrete Factories.

The " Liner " Light Stone and Brick Breaker.

The 10-in. x 6-in. size Portable engine-driven Model will be shown. Made in sizes of 12-in. x 7-in. and 14-in. x 8-in. as well. Also Brick Breakers and Heavy Duty Stone Breakers.

Concrete Moulds.

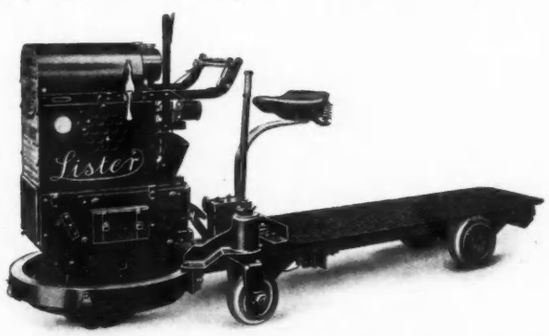
A most comprehensive range of these will be shown, including Flag, Kerb (both straight and radius), Fence-Post, Pipe, Garden Ornament and Air Grate Moulds. Some tens of thousands in use. The mould for making flags with an indented face should prove of great interest to surveyors.

Also Slab, Block and Brick Machines, Sand and Gravel Washing and Screening Plant, Friction Hoists, Pumps, etc.

R. A. LISTER & CO., LTD., Gloucester, will be showing a

1½ h.p. Hopper Cooled Petrol Engine, suitable for the driving of small concrete mixers and pumps. Supplies steady power under the most erratic load conditions.

3 h.p. Tank Cooled Petrol Engine.—A standard Lister model widely used for the driving of industrial machinery.



The Lister "PHC" Auto-Truck with PR Power and Steering Unit.

9 h.p. Hopper Cooled Petrol Engine.—A recently introduced model, fitted with a specially designed combustion chamber to ensure the thorough mixing of gases. By this means the maximum brake h.p. is obtained with the minimum fuel consumption. The exceptionally heavy crankshaft extends beyond the flywheels on both sides, thus allowing for pulley or coupling to be fitted on either side or each side as desired.

10 h.p. Portable Spray Cooled Diesel Engine.—Low consumption of cheap fuel oil characterises the operation of this engine. The Lister patent combustion chamber ensures easy starting by hand from cold on the fuel on which it runs without the use of cartridges, electric ignition, plugs, or any external starting device.

Swivel Tipping Autotruck. Type " NPS."—This truck has a body of 36 cu. ft. capacity mounted on a turntable making it possible to discharge the load on either side or to the rear of the truck.

The S.S. Power and Steering Unit, which can be supplied with any Lister Auto-Truck, is fitted to this model. It is specially designed for use where surface conditions and speed necessitate exceptionally resilient springing, with a more rigid and substantial steering unit. Two laminated springs, connected by shackles to the frame plate support the axle and driving wheel. These minimise the vibration of the truck chassis and platform, and thanks to specially formed blocks at both ends of the top-leaf, the springing remains as far as possible in effect under all loads. Ball bearings are fitted throughout this unit. The final drive from the countershaft to the driving wheel is by Duplex roller chain.

Mechanical Sweeper and Sprinkler Model Auto-Truck. Type " S."—Supersedes hand labour for sprinkling and brushing, with a big saving in time, labour and costs. It can be driven by a boy and does the work of many men with buckets and brooms. In common with Lister auto-trucks it is speedy, economical, easily manoeuvred and simple to control.

Elevating Platform Model Auto-Truck. Type " PHC."—The model shown is fitted with the new S.S. power unit described above, and is designed for use with stillages. Having a platform of only 20-in. wide, this truck easily negotiates narrow gangways and entrances.

Lister Rail Truck. Type " R2."—This incorporates the main features of the 9 h.p. twin-cylinder engine, and is of greater capacity than the earlier model Lister rail truck. The advantages of this petrol-driven loco over steam types are obvious. It is always ready for duty; starting is instantaneous after inactive periods, initial outlay is low; it can be used indoors and outdoors. There are no smoke nor sparks to cause fire. It is an ideal loco for quarries, sand and gravel pits and the agricultural, public works and building industries.

MILLARS' MACHINERY COMPANY LIMITED, London, Stand 53, are exhibiting

Tar and Bituminous Macadam Plant.

Capacity: 10 tons per hour. Dryer Oil Fired. Fitted with Feed Elevator, Fan, Discharge Hopper. Mixing Unit embodies well-known Millars' Twin Shaft Paddle Mixer—9 cu. ft. batch capacity—with Skip Loader, Measuring Hopper and Roofing.

A novel feature is the set of four lifting frames on which the Mixing Unit can be raised for working and to allow a lorry to back under to take the discharge and to be lowered on to a Platform Lorry for transport.

Platform Hoist.

Capacity: 10-cwt. operating at speeds of 100 or 200-ft. per minute, with petrol-driven Winch to suit.

Brick and Light Stone Crusher.

Combined with Petrol Engine and mounted on road-wheel truck. Size of Crusher 10-in. x 6-in. Engine 6½ h.p. "Lister" hopper-cooled unit. Capacity: Up to 25 tons per day.

Millars' Tructractor.

Fitted with 30 cu. ft. capacity Automatic End Dump Body. Carrying capacity: two tons. 4-cylinder Petrol Engine 16 b.h.p. 1,600 r.p.m. High Tension Magneto Ignition. Thermo-syphon cooling. Wheels fitted with giant solid rubber tyres. Turning radius 10-ft.

Millars' Sand Lime Mixer.

Pan type. 4-ft. 6-in. diameter. Fitted with Petrol Engine and mounted on road-wheel truck.

" Millars'-Jaeger " Tilting Drum 4/3-ST Concrete Mixer.

Capacity: 15/20 cu. yds. per 8-hour day. Mounted on chassis with two road wheels. Sliding Draw bar. 1½ h.p. " Lister " Petrol Engine. Hans Renold Roller Chain Drive. Rivetted frame of steel angles, no welding.

" Millars'-Jaeger " Tilting Drum 6/4-L Concrete Mixer.

Capacity: 36/45 cu. yds. per 8-hour day. Mounted on four-wheel truck. 3 h.p. Vertical Petrol Engine with patented hinged crank case to give immediate access to all working parts. Power-operated side loader bucket with automatic shaker gear and automatic control gear. Renold Chain Drive.

" Millars'-Jaeger " Tilting Drum 10/7-L Concrete Mixer.

Capacity 70/80 cu. yds. per 8-hour day. Mounted on four-wheel truck fitted with Convertible Stub Axles to give end or side discharge as required. 5 h.p. Vertical Petrol Engine with patented hinged crank case to give immediate access to all working parts.

Power-operated side or end loader bucket with automatic shaker gear and automatic control gear.

Millars' New Non-Tilting Drum 10/7 Concrete Mixer.

Capacity: 70/80 cu. yds. per 8-hour day. Mounted on four-wheel truck fitted with convertible Stub Axles to give end or side discharge as required. 5 h.p. Vertical Petrol Engine with patented hinged crank case to give immediate access to all working parts.

Public Works, Roads and Transport Exhibition—continued

Power-operated side or end loader bucket with automatic shaker gear and automatic control gear.

Millars' 4-in. Single Diaphragm Portable Pump.

Capacity: Up to 8,000-gallons per hour. Fitted with 3 h.p. Horizontal Hopper-cooled Petrol Engine, High Tension Magneto.

Millars' 3-in. Single Diaphragm Portable Pump.

Capacity: Up to 5,000-gallons per hour. Fitted with 2 h.p. "Lister" Vertical Petrol Engine, Hopper-cooled with High Tension Magneto.

Millars' 5-in. Centrifugal Pump.

Capacity: 30,000-gallons at 50-ft. total head. Fitted with 24 h.p. "Ford" Industrial Petrol Engine, British-made. Pump is fitted with wheel valve to control output and thus eliminating frequent priming. The whole mounted on truck with special wide steel tyred road wheels, viz., 8-in. wide on tread, for travelling over soft ground. Total weight: Only 12½-cwts.

All plant exhibited is British-built at the firm's works, Bishop's Stortford.

PRIESTMAN BROTHERS, LTD., Hull—Stand 31—

will be exhibiting one of their No. 15 (½ cu. yd.) Universal Excavators with the sides of the house removed, so that visitors may clearly see the machinery. It is the 1932 model of an already well-known machine, and represents the last word in Excavator design, owing to such features as having its two barrels on separate shafts (both of them being keyed on to the shafts and requiring no bushes) and also owing to the very robust mild steel built-up undercarriage with its four full-length axles and fully protected travelling gear. The latter, which is composed entirely of bevel-and-spur gearing, is completely protected from the entry of mud and stones by cast steel guards.

A Priestman No. 15 (½ cubic yard) Universal Excavator, which will be on show.

There will also be on the Priestman stand two Grabs; a 21/17 normal weight sand Grab, and a 15/13 pick pointed whole-tine Grab for coarse, hard gravel. They both incorporate the unique Priestman features of a Cast Steel Centre Girder and Anti-grit Bowl combined, and a narrow head which not only gives a rigid "A" frame construction and a low centre of gravity, but enables the Grab easily to be manoeuvred under the coamings of barges and ships, which feature is often of great value when discharging sand, coal, ore, etc.

These Grabs are the outcome of 56 years' experience in the manufacture of Grabs. It is also interesting to note that Priestman Brothers market a range of 1,000 different types and sizes of Grabs.

RANSOMES & RAPIER, LTD., Ipswich—Stand No. 49, Main Hall—

are showing the R. and R. Type 420—½ cubic yard Universal Excavator, which forms the central exhibit on this Stand.

The machine is shown equipped as a Skimmer Scoop and powered by Diesel engine. It can, however, be quickly adapted for use as Shovel, Dragline, Back Trencher, Grab, Crane or Pile Driver. Electric or petrol drive can also be supplied.

As Ransomes & Rapier were the pioneers in this country of cast steel construction for Excavators, the embodying of the underframe and crawler frames in one steel casting is of particular interest, this being a unique feature. The travelling mechanism is all direct bevel-and-spur gears, with the last reduction enclosed in oil bath. No chains are used.

Another feature contributing to the success of R. and R. machines is the design of crawlers. The weight is taken through to the treads on a number of closely spaced rollers, ensuring even distribution and keeping the belt in proper contact with the ground the whole time. There is no chance for the treads to buckle up between the rollers. The entry of dirt, stones, etc., into the mechanism is prevented by the enclosing nature of the crawler frames.

There is also shown on the same Stand a Fairlead as fitted to the R. and R. Type 420 Dragline, for guiding the bucket dragging rope. This, again, is of unique design. Besides the four pulleys—two vertical and two horizontal—there are two extra vertical long rollers. The drag rope passing from the guiding pulleys, runs on the long rollers and there is thus no fixed guard or edge to wear the rope.

The Dragline bucket exhibited is a further example of the high-class construction of R. and R. excavators. This bucket is very robust throughout, and has manganese reversible teeth.

A point which the Type 420 emphasises is the consistency of the R. and R. design. It will be seen that the same principles are incorporated as are included in the whole range of R. and R. excavators.

The R. & R. Type 420—½ cubic yard Universal Excavator.

Concrete Mixers.

In the space available it is impossible to show more than typical examples of the firm's very extensive range of Tilting and Rotary Drum Mixers.

Of the Tilting Mixers the "7-T," with a capacity of 10/7 cu. ft. per batch, represents an ideal machine for all public and municipal work. Rigid in construction, but of low weight, it is a fast working, highly mobile machine.

Another model of particular interest is the "Lightweight Concrete Placer," consisting of the well-known Lightweight Mixer, capacity 7/5 cu. ft. per batch, with self-supporting swivelling placer boom and bucket. Numbers of these machines are now being used for road work in the United Kingdom.

Typical of the Rotary Drum range, the "10-R," capacity 14/10 cu. ft., is shown in its latest improved form with new type of drum, Ackerman type steering, etc.

REAVELL & CO., LTD., Ipswich—Stand 73, Row B—

will be exhibiting a

D.P.V.6 Compressor.

This is a newly designed high-speed Compressor, which, due to its neat design and high volumetric efficiency makes an ideal component for Portable Sets. It is a two-crank single-acting water-jacketed Compressor running at 1,000 r.p.m., has a displacement of 148 cu. ft. per minute and a maximum working pressure of 100 lbs. per sq. in. The chief feature of the machine is the piston type suction valve which enables high volumetric efficiencies to be obtained at this speed. The action of the piston valves allow the delivery valves (which are of their usual plate type) to seat more slowly than they otherwise would; this eliminating shock and ensuring long life.

No. 0 Portable Compressor.

This Portable Set is specially designed for the repair and maintenance of wrought iron and steel structures, its duty being to operate caulking, rivetting and chipping hammers, cleaning and paint spraying apparatus. The Compressor running at 1,400 r.p.m. has a displacement of 54 cu. ft. per minute and a maximum pressure of 100 lbs. per sq. in. The Compressor is direct coupled to a petrol engine, mounted on a cast steel chassis, complete with all fittings, receiver, tool box, fuel tank, radiator and water circulating pump. An automatic unloading device is fitted which maintains a pressure of 100 lbs. in the receiver, unloads the Compressor above this pressure and automatically slows down the engine to an idling speed until the pressure has dropped to the minimum when the reverse to this operation takes place.

No. 1 Portable Compressor.

A portable plant of strong and dependable character which, like exhibit 5, is designed to satisfy a growing demand for

Public Works, Roads and Transport Exhibition—continued

cold starting Diesel engine driven units. The Compressor, the firm's P.V.6 piston valve type single-crank single-acting water-jacketed machine, running at 1,000 r.p.m. displaces 74 cu. ft. per minute. The Compressor is direct coupled to a "Lister" high-speed Diesel engine with B.E.S.A. 12-hour rating of 17.6 b.h.p. at 1,000 r.p.m.; the whole being mounted upon a built-up steel chassis mounted on rubber tyred wheels. The set is complete with all usual fittings.

New Type No. 3 Portable Compressor.

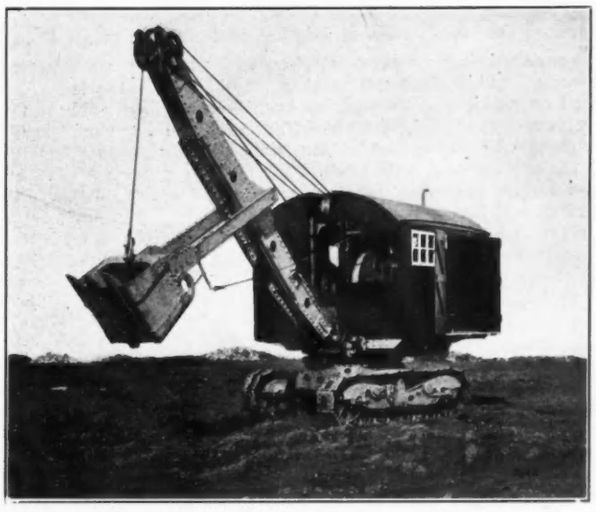
This Portable Set is an unusually attractive proposition, comprising as it does one of their new type D.P.V. piston valve Compressors and a four-cylinder "Lister" cold starting Diesel engine with B.E.S.A. rating of 35 h.p. at 1,000 r.p.m. The Compressor is similar in principle to that of exhibit No. 1 with, however, certain refinements. Exhibit No. 1 is splash lubricated suitable for stationary work, but this Compressor is made with automatic forced food lubrication to all bearing surfaces. The gear type pump and oil pressure gauge are mounted on the end cover. Separate feeds are led through fine adjustment sight feed lubricators to the piston valves. This Compressor has been fitted with valves and pistons of special aluminium alloy, this making for smoother running than its prototype, a feature which aroused favourable comment at the Shipping, Engineering and Machinery Exhibition. The Compressor has a displacement of 148 cu. ft. per minute and a final pressure of 100 lbs. per sq. in. The unit as a whole is complete with air receiver, tool box, fuel tank, silencers, radiator and water circulating pump, and all usual fittings including unloading and automatic slowing device. The chassis of built-up steel is mounted on rubber tyred wheels, the back pair incorporating brake drums and the front pair are swivelling and fitted with a drawbar.

RUSTON-BUCYRUS, LTD., EXCAVATOR WORKS, Lincoln—Stand 41—

will be showing a Ruston-Bucyrus New No. 4 Universal ½-cubic yard Excavator.

A number of modifications and improvements in design have recently been effected in the Ruston-Bucyrus ½-cubic yard excavator, of which type over 700 machines have been manufactured. The new model, known as The New No. 4, is fitted with an entirely new caterpillar mounting, the main features of which are:—

1.—Heavy Cast Steel Bottom Frame.
2.—"Single Shaft" Drive.
3.—Final Chain Drive.



Ruston-Bucyrus New No. 4 Universal ½ cubic yard Excavator, which will be on show.

The single piece cast steel carriage is absolutely rigid and provides easy acessibility to all details fitted to it. The "Single-shaft" chain drive dispenses with many of the moving parts necessary in a gear drive, and is the simplest and most accessible drive fitted to any make of excavator; only one driving shaft and one set of gears, the latter totally enclosed, are fitted below the platform. A two-speed travelling gear is fitted above the platform and out of the way of mud and dirt.

This type of construction has stood up to the most gruelling field tests on hundreds of machines for over three years and is giving complete satisfaction.

Al the travelling and steering operations are controlled by the driver with the superstructure in any position. A two-way brake holds the machine up to its work in digging and is useful when the machine is travelling on steep slopes.

Each of the caterpillar tracks with its side frame, sprockets, rollers, etc., is a complete unit. They are carried by two "dead axles" which take the whole weight of the superstructure. The driving axles take only the travelling load. The load is distributed over five points in each track.

Improvements in the front-end equipments have increased the working ranges. In the case of the New No. 4 Shovel (as shown at the Exhibition) a new all steel box girder boom has been incorporated. This type of boom is light but strong and permits high slewing speeds while reducing the digging stresses. The shovel bucket is of mild steel with a cast steel back and is of new design to give increased strength and efficiency.

The motive power of the New No. 4 can be Diesel engine or petrol engine or electric motor.

The machine exhibited on Stand 41 is fitted with a Diesel engine, a two-cylinder "Ruston" type 2 VQ engine which has been specially manufactured for use in the New No. 4. Fuel consumption in this engine is approximately ¾ gallon per hour. If desired a small petrol engine starting equipment for the Diesel engine can be supplied.

THOS. SMITH & SONS (RODLEY), LTD., Rodley, Leeds.

The main exhibit is a standard ½-cubic yard Universal Excavator with Navvy Shovel attachment. Alternative attachments for dealing with different classes of excavation are available. Conversion from one attachment to another is quickly made without alteration to the main machinery. The power unit is a McLaren Benz-Diesel Engine with a fuel consumption of 1 gallon per hour. The fuel tank holds sufficient fuel for about 3 to 4 days' running. Petrol, petrol-paraffin or electric drive may be utilised. The machine can operate in a full circle.

Standard ½ cubic yard Universal Excavator with Navvy Shovel attachment, which will be on show.

Caterpillar Travelling Gear is standard, giving great mobility, and liberally proportioned tracks minimise the ground pressure.

The machine can be steered to any curve, steering being controlled by the driver. Friction Brakes lock the machine when digging. Two travelling speeds are provided, being half and one mile per hour. A one in four gradient can be climbed.

Power for the different motions is transmitted through fibre-lined Friction Clutches.

The Reduction Gears from the engine to the machine is of the double helical type, fully enclosed in an oil-tight case for maximum efficiency and quiet running. Two rope barrels, each on a separate shaft, are placed on the centre line of the machine, thus centralising rope pulls and stresses. Grooves are machine cut in the barrels to prolong the life of ropes. All control levers are grouped within easy reach of the driver at the front of the machine.

The exhibited machine is fitted with a house frame only, to enable the machinery to be inspected. Actually all standard machines have complete lock-up houses.

Outputs vary from 30 to 60 cubic yards per hour, according to the material being excavated and working conditions. Actually over 60 cubic yards per hour has been obtained.

Other exhibits consist of a working model of a steam Locomotive Crane with a Grab, also model of the firm's Level-Luffing Type Crane.

STOTHERT & PITT, LTD., Mixer Dept., Bath, Stand 33, Row B, will be exhibiting—

Concrete Mixing and Distributing Plant (patent applied for).

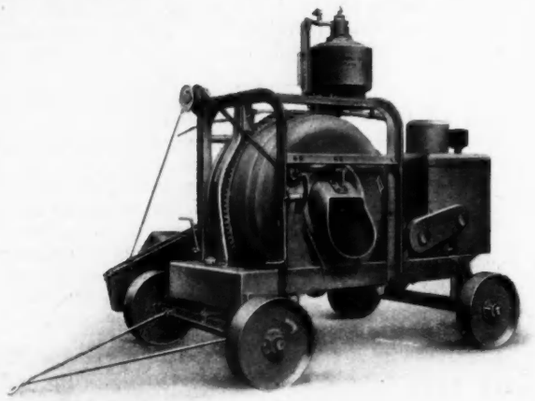
This plant incorporates the well-known No. 7 Victoria Mixer mounted on raised truck, with rising loader arranged to dis-

Public Works, Roads and Transport Exhibition—continued

charge on to a belt conveyor which delivers to a counter-balanced swivel chute. The chute will revolve through 360 deg. from the head of the conveyor, while the latter revolves through approximately 180 deg. The main feature of this plant is that concrete can be distributed within a radius of 25-ft. without moving the mixer and without any support outside the mixer truck.

" Super Ten " Victoria Mixer.

This machine is of entirely new design, apart from retention of the well-known principle of the drum mixing blades, and incorporates many unique features. Direct coupled to a 7½ b.h.p. Lister engine and fitted with side-loader, water tank, and spring-borne road truck, the machine deals with unmixed batches of 15½ cubic feet and weighs only 2¼ tons. The water tank of syphon type is one of the outstanding features, and is provided with instantaneous adjustment to regulate the delivery to the mixer drum to within one gill, and perfect accuracy is ensured. Ball bearings are provided for all shafts which are continuously running, while speed and portability with ease of control are the main objectives.



The "Super Ten" Victoria Mixer with 7½-b.h.p. Lister Engine, Side Loader, Water Tank and Spring-borne Road Truck.

No. 5 Tilting Mixer.

This machine is their well-known open drum type mixer with petrol engine, side-loader, water tank and road wheel truck, for output of 45 cubic yards per 8-hour day at the rate of 30 batches per hour.

No. 3½ Tilting Mixer.

This handy size machine direct coupled to a 1½ b.h.p. Lister engine will be provided with rubber tyred spring-borne truck, and thereby made specially suitable for attachment to a lorry for haulage on its own wheels.

Tar or Bituminous Macadam Mixer.

A 16 cubic feet Paddle Mixer incorporating their latest improved box with manganese steel renewable wearing strips and manganese steel adjustable tips on blades.

Vibratory Screen.

A three-tier vibrating screen coupled to an electric motor.

NOTE.—Interesting screens of other types will be exhibited by their associated company, Messrs. J. and F. Pool, Ltd., on the stand opposite.

Quarry and Tarmacadam Plants.

Numerous plants installed will be illustrated by means of photographs, lack of space preventing actual machines being exhibited.

TECALEMIT, LTD., Brentford,

are showing High Pressure Lubrication for all types of machinery by the Tecalemit Systems of Central Lubrication, Grouped Nipples, Mechanical Pumps, and by Tecalemit, Tecazark, Alemite, Lub and Dot Systems of Guns and Nipples.

Power Driven Lubricating Equipment:—

Automatic Conveyor Lubricators.
Pressure Gauges and Sight Feeds.
Oil and Fuel Filters and Cleaners.
High Pressure Flexible Connections.
Spring Lubricators.
Viblock Clips.

Tecalemit Lubricants:—

Pure Solidified Oil.
Non-Separator Lubricant.
Roller Bearing Lubricant.
High Melting Point Lubricant.
Tecraphine Lubricant (Graphite).

Equipment for Handling Bulk Lubricant:—

Easy Filler Tins.
Gun Filler Attachments.
Barrel to bearing without exposure.

THOMAS & BISHOP, LTD., 37, Tabernacle Street, E.C.2,

are showing Cling-Surface, which ends belt troubles.

Leather belting may be considered scientifically. Under a powerful microscope it has revealed a very interesting fact that will solve many of the problems with which the belt-user has to contend. It has been found that each square inch contains some 8,000 tiny vacuum cups.

These are apparently hard and useless. But treat them with Cling-Surface and they immediately become pliable—take on new life. Now they are perfect vacuum suckers that quickly stop belt slip and power loss.

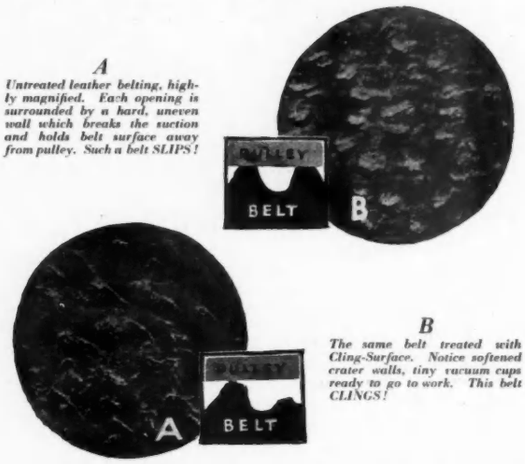
Thus to treat a belt with Cling-Surface and run it without tension simply means that more of these vacuum cups come in contact with the pulley and there is increased pulley lap without any fear of slip and with greater load-carrying capacity.

It should be remembered that there is always the possibility of a poor dressing answering the immediate purpose at the ultimate expense of the belt.

Over-treatment should be avoided. A very small quantity of Cling-Surface applied regularly—say once a week—keeps a belt in good condition and increases its life by years.

A

Untreated leather belting, highly magnified. Each opening is surrounded by a hard, uneven wall which breaks the suction and holds belt surface away from pulley. Such a belt SLIPS!



B

The same belt treated with Cling-Surface. Notice softened crater walls, tiny vacuum cups ready to go to work. This belt CLINGS!

Permac, the Metal-to-Metal Jointing Material in Powder Form.

Permac, being rustless, is unequalled as a steam and water jointing, and it does not weaken nor become saturated when used on oil joints. Permac has been found indispensable in the erection of Sectional Tanks and Constructional Plant used in Oil or Benzol Recovery and in Tar Distillation and De-Hydration; in the erection of plant for Ammoniacal and Naphthaline Washers and for hot and cold Liquor Tanks in Breweries; in the construction of Jacketed Pans, etc.

Permac is economical both from its low initial cost and because it allows of no waste material. Joints do not have to be " followed-up," and the pressure can be turned on immediately the joint is made.

Flexo Tinning Compound.

Flexo Compound cleans and tins in one operation.

Application is simple. The surface to be tinned must be heated to a few degrees above ordinary soldering heat, and the Compound can be applied with a soldering bit, an old hack-saw blade or any convenient piece of flat metal.

The tin penetrates into the metal from two to three times as deep as when tinning is carried out with killed spirits or resin. Two pieces of metal tinned and soldered with Flexo cannot be torn apart without risk of fracturing the metal.

TILBURY CONTRACTING & DREDGING CO., LTD.,
Tilbury House, Petty France, Westminster, London, S.W.1.,
Stand 42,

are exhibiting the various productions in granite and ragstone from their quarries in Inverkeithing, Scotland, and Maidstone, Kent. These materials will be shown in all sizes suitable for use in road-making.

They are also exhibiting for the first time a wide range of fillers now being produced by them at a new and up-to-date plant which they have erected in Maidstone. These Fillers are prepared from various materials with limestone, granite and slate bases, and are suitable for use in the manufacture of all types of asphalte, cleansers, abrasives, etc.

Port of Southampton Topics

Docks Extension Site Showing Good Progress.

EXCELLENT progress continues to be made on the Docks Extension site on the Western Shore, Southampton, and there is ample justification for anticipating that the first 1,000-ft. berth will be available for the use of shipping next spring.

During the past three months the last of the monoliths to be sunk under the first section of the scheme reached its final depth, so that there are now 78 of these monoliths extending 3,800-ft., in readiness for the construction above them of the platform which will constitute the new quay. On that platform cranes, railway lines and other dockside equipment will ultimately come into being. Part of the work in relation to the foundations of the new passenger and cargo sheds has already been done, so that a push will soon be started on an entirely different phase of work from that which has so far been engaging the attentions of the engineers.

Plans are now being actively pushed ahead in connection with the second section of the extension scheme, which will involve the sinking of a further 70 monoliths and will provide an additional 3,500-ft. of deep-water quay wall. As was the case in the first section of the scheme, the initial preparations are taking the form of building a reclamation bank which will be faced with brushwood facines. The special plant, Bankwell, owned by Messrs. James Dredging, Towage and Transport Co., has made good progress on this bank, some 1,500-ft. having been already completed.

Reverting to the first section of the scheme, reference must be made to the progress made in the reclaiming of 187 acres of mudland from the River Test. A powerful reclamation hopper has been dumping continuously day and night, and the result is that some 50,000 tons of grey clay and sand, scoured from the new deep channel, has been pumped ashore into the area enclosed. Up to the present something like 40 acres have been won back from the river bed.

At Millbrook, at the far extremity of the extension works, the contractors are preparing for the construction of the 1,200-ft. graving dock, which will be the largest in the world. Mechanical excavators have been tearing up the mud covering the surface of what will be the site of the dock, and so well have they progressed that they are now biting down into the harder subsoil. They have a big task before them, for it is computed that about a million yards of material will have to be lifted in the hollowing-out process.

Dock Statistics Still showing Decreases.

Southampton Dock statistics for September do not make particularly good reading, for under eight of the eleven headings into which the traffic of the port is listed decreases are shown compared with the corresponding month a year ago. The number of vessels dropped from 377 to 340 inward and from 367 to 326 outward. The gross tonnage inward fell from 1,742,109 to 1,668,130, but the outward figure rose from 1,632,038 tons to 1,663,645 tons. The net tonnage totals both slumped, the inward figure from 911,741 tons to 867,506 tons, and the outward from 854,419 tons to 852,620 tons.

The amount of cargo handled during September declined by over 10,000 tons in comparison with the corresponding month in 1930, for the inward figure was 3,413 tons less and the outward total was 6,826 tons down. In the passenger figures the inward number rose from 39,993 to 41,241, but this gain was swallowed up by the fall from 34,243 to 31,991 outward.

Lloyd's Register Shipbuilding Returns for Quarter ended 30th September, 1931

FROM the statistics issued by Lloyd's Register of Shipping regarding vessels under construction at the end of September, in Great Britain and Ireland there is a decrease of 138,218 tons in the work in hand as compared with the figures for last June, and the present total—417,385 tons—is 699,361 tons less than the tonnage which was being built at the end of September, 1930. Moreover, the figure for September, 1931, includes about 64,000 tons on which work has been suspended. The present total is the lowest recorded since September, 1887.

Over 96,000 tons of the tonnage now in hand in this country are intended for registration abroad or for sale.

The tonnage now under construction abroad—1,113,735 tons—is about 157,000 tons less than the work which was in hand at the end of June, 1931.

The six leading countries abroad are: United States of America, 261,364 tons; France, 169,720 tons; Italy, 159,147 tons; Sweden, 121,080 tons; Germany, 113,468 tons, and Holland, 95,216 tons.

The total reduction, as compared with September, 1930, which has taken place in the aggregate tonnage building in these six countries amounts to only 17½ per cent., as compared with a reduction of 62½ per cent. for Great Britain and Ireland.

The total tonnage under construction in the world amounts to 1,531,120 tons, of which 27¼ per cent. is being built in Great Britain and Ireland, and 72¾ per cent. abroad. The average percentages in the last twelve months before the war were 57.2 for Great Britain and Ireland and 42.8 for abroad.

In Great Britain and Ireland, 38,675 tons were commenced during the last three months—an increase of 15,316 tons on the corresponding figures for the June quarter. For the purpose of comparison during the six months ended March, 1930, the monthly average of tonnage commenced was over 154,000 tons. During the third quarter of 1931, 80,340 tons were launched—a decrease of about 90,000 tons as compared with the quarter ended June 30th last. Similar figures for abroad are 134,685 tons commenced and 306,268 tons launched, showing a decrease, as compared with the previous quarter, of 76,394 tons in the tonnage commenced, but the slight increase of 4,000 tons in the tonnage launched.

The oil tankers under construction in the world amount to 64 vessels of 505,258 tons, of which 16 vessels of 122,408 tons are being built in Great Britain and Ireland, 14 vessels of 107,450 tons in Sweden, and 8 of 81,590 tons in Germany. It is noteworthy that of the 64 tankers under construction, 59 are motorships.

The tanker tonnage now in hand represents 33 per cent. of the total steam and motor tonnage being built in the world.

During the first three quarters of 1930, the tonnage of motorships under construction in Great Britain and Ireland exceeded that of steamers being built, but since the end of last December steam tonnage has again exceeded motorship tonnage, the excess at the end of September, 1931, amounting to over 91,000 tons. The motorship tonnage being constructed abroad (613,710 tons), is 115,114 tons greater than that of the steamers.

Of the vessels being built in the world at the end of September, there are 6 steamers of between 8,000 and 15,000 tons, while the motorships amount to 45. Of the larger vessels, i.e., those of 15,000 tons and upwards, however, 7 are steamers of between 15,000 and 30,000 tons, and 6 are steamers of 30,000 tons and upwards, while there are only 4 motorships in the former division, and none in the latter.

The table respecting marine engines shows that the horse-power of steam engines now being built or being fitted on board amounts to about 1,086,000 horse-power, while the figures for oil engines aggregate about 619,000 horse-power. The figures for steam engines include 35 sets of turbine engines of about 978,000 shaft horse-power, giving an average of nearly 28,000 horse-power per set. The horse-power of the steam reciprocating engines (107,985 horse-power) is only 6⅛ per cent. of the total horse-power of marine engines now building in the world.

Tonnage to Lloyd's Register Class.—Notwithstanding the great reduction which has taken place in the amount of work in hand, the tonnage actually in course of construction throughout the world under the inspection of Lloyd's Register reaches 894,598 tons; of this total, 383,092 tons are building in Great Britain and Ireland, and 511,506 tons abroad.

Exhibition at Vickers Showroom, Broadway, London, S.W.

Great Public Interest in the Schneider Trophy Machine.

The exhibition in the Vickers Showroom at Broadway, Westminster (which has been recently considerably extended), of the Vickers Supermarine Rolls-Royce S6, which won the Schneider Trophy outright for Great Britain last month, and also established the world record speed of 408.08 m.p.h., aroused great public interest. This interest was considerably enhanced during the evenings by the display in a window adjoining the machine of cinematograph film records of the actual Schneider Trophy event as recorded by the firm's Cinematography Department.

Jugoslavian and Near Eastern Port Matters.

ACCORDING to information received from the Black Sea ports, a large grain silo is being built at Cherson having a capacity of 50,000 tons, that is 9,000 tons larger than the silo built in 1930 at Nicolajeff. The new silo will have a loading power of 540 tons of wheat per hour. Two identical silos are being built at Mariupol and Odessa.

Large harbour improvements are also being carried out at Batum, where a new dock is being built west from the present harbour. The new dock will be used exclusively for oil tankers, thus increasing the facilities for general cargo. In connection with the situation of Russian ports, it should be noted that the convention for harbour charges between the U.S.A. Shipping Board and the Russian Authorities was to expire, but that it has been renewed with the understanding that American steamers shall pay the same taxes as the vessels of countries which have a commercial treaty with Russia, and this in spite of the fact that the U.S.A. Government has not recognised as yet " de jure " the Russian Government. By the new agreement the Russian Government has engaged to use only American Shipping Board ships to convey their purchases from America to Black Sea ports.

According to statistics which have just been published, shipping at Varna and Burgas during 1930 included 5,952 ships and 1,973,386 n.r.t. Included in this total were 281 Italian ships and 602,127 tons, 415 Bulgarian ships and 574,873 tons, 115 British ships and 246,250 tons, and 80 German ships and 170,419 tons.

According to statistics which have been published by the Ministry of National Economy of Greece, shipping at Greek ports during the first seven months of 1931 included the items given in table at foot of page.

According to information from Cavalla, considerable progress has been made in the harbour enlargements there, and the situation of shipping has greatly improved. A breakwater, 150 metres long, 11 metres wide, and 6 metres deep, has already been completed, and a further 600 metres have yet to be constructed.

Cargo and passengers carried by British vessels to and from Greek ports in the course of the last few years are as follows:—

	ARRIVALS		CLEARANCES	
	Goods Tons	Passengers	Goods Tons	Passengers
1922	573,269	30,015	33,894	6.339
1923	548,657	16,157	52,798	7,689
1924	534,012	15,858	57,586	14.866
1925	415,292	11,061	61,947	10,841
1926	208,973	9,646	71,216	9.397
1927	306,140	8,079	71,788	7,125
1928	292,163	5,700	60,217	5,230
1929	323,430	8,489	72,000	7,642
1930	306,007	8,130	76,500	6,140

It will be noticed that a considerable increase is shown in the exports from Greece by British ships.

Supplementing previous reports regarding the development of trade at Jugoslav ports, it may be interesting to point out that total shipping in the course of the past few years included the following figures:—

	Shipping with Jugoslav Ports		Shipping with Foreign Ports	
	Imports (Centals)	Exports	Imports (Centals)	Exports
1928	2,647,990	3,124,387	4,711,657	15,796,353
1929	2,637,069	2,800,194	6,183,912	18,283,480
1930	2,568,144	2,461,110	5,259,702	17,880,865

It may be added in connection with trade with foreign ports that during 1930 this trade has been handled by the following countries:—

	Imports	Per Cent.	Exports	Per Cent.	Total	Per Cent.
Jugoslav ...	2,417,951	45·97	4,640,603	25.96	7,058,554	30.50
Albanian ...	107	—	114,622	0.64	114,729	0.50
Danish ...	—	—	31,000	0.17	31,000	0.14
Egyptian ...	—	—	168,872	0.94	168,872	0.73
British ...	108,017	2.06	288,051	1.61	396,068	1.71
French ...	7,230	0.14	131,647	0.74	138,877	0.60
Greek ...	559,855	10.64	868,402	4.86	1,428,257	6.18
Dutch ...	397,541	7.56	47,816	0.27	445,357	1.93
Italian ...	1,075,850	20.46	11,168,620	62.46	12,244,470	52.91
Hungarian	—	—	23,614	0.13	23,614	0.10
German ...	589,651	11.21	189,911	0.78	729,562	3.15
Norwegian	19,855	0.37	—	—	19,855	0.08
Portuguese	—	—	1,166	0.01	1,166	—
Spanish ...	—	—	235,011	1.32	235,011	1.02
Turkish ...	77,635	1.48	21,530	0.11	99,165	0.43

According to communications from Belgrade, the Jugoslav Ministry for Communications is considering increasing the unloading facilities in the Port of Split, and that a further quay is to be built at Bakar (East from Sussak and Fiume), but it does not appear that the Jugoslav Government has any idea of starting the construction and organisation of the General Bonded Stores at Sussak owing to the depression in shipping, which is seriously affecting all the Eastern Adriatic ports, especially in view of the decreased exports of lumber. The question of the oil unloading facilities at Split is again being discussed, and it is pointed out that the Belgrade Government should take up this question, since the only unloading facilities existing at Split belong to a private concern.

Concerning Eastern Mediterranean ports, shipping at Mersina in the course of the past few years included the following items:

	Interior Trade		Foreign Trade	
	Imports Tons	Exports Tons	Imports Tons	Exports Tons
1926	17,742	20,089	27,967	46,634
1927	10,951	14,285	36,906	38,635
1928	34,437	16,518	72,989	32,850
1929	54,529	24,147	79,991	34,677
1930	56,973	14,417	65,201	60,751

It will be seen that total shipping at Mersina is now about 200,000 tons, against slightly over 100,000 tons in 1926, and this is due to the fact that the Kemal Pacha Government has agreed to the development of railway connections between this port and its hinterland.

London's Shipping.

During the week ended October 2nd, 881 vessels, representing 826,478 net registered tons, used the Port of London; 515 vessels (683,434 net registered tons) were to and from Colonial and foreign ports, and 366 vessels (143,044 net registered tons) were engaged in coastwise traffic.

* * * *

During the week ended October 9th, 894 vessels, representing 948,196 net register tons, used the Port of London; 522 vessels (774,846 net registered tons) were to and from Colonial and foreign ports, and 372 vessels (173,350 net registered tons) were engaged in coastwise traffic.

* * * *

During the week ended October 23rd, 1,062 vessels, representing 960,286 net register tons, used the Port of London. 541 vessels (781,763 net register tons) were to and from Colonial and Foreign Ports and 521 vessels (178,523 net register tons) were engaged in coastwise traffic.

Tilbury Passenger Landing Stage.

Twenty-nine vessels totalling 279,314 gross registered tons used the Tilbury passenger landing stage during the month of September. Altogether over 4,000 passengers were embarked or disembarked at the stage, in addition to baggage and mails.

Canadian Cheese.

Montreal has just sent to London the largest freight of cheese for many years. It has arrived in the Surrey Commercial Dock in the s.s. " Beaverhill " and consists of about 38,000 boxes, equal to 1,450 tons. The whole quantity has been placed in the Port Authority's cool store at that dock.

Quick Unloading at the Port of Manchester.

On another page is described the quick discharge of iron pyrites at Manchester Docks, when a cargo of 2,289 tons was unloaded from the s.s. " Lilburn " in 11 hours (44 crane hours).

This speed has just been exceeded at the same berth in the case of the s.s. " Konstan," from which a cargo of 2,347 tons of ore from San Juan was discharged in 30 crane hours, an average of 78 tons per grab crane per hour. This is 50 per cent. quicker than the case of the s.s. " Lilburn," the increased speed being due to the cargo being stowed conveniently beneath two large open hatches and to the soft quality of the ore which permitted the cranes to lift the full weight of 2 tons 10 cwts. in each hoisting. The cargo was loaded direct to main line wagons for conveyance to Imperial Chemical Industries' works at Deighton.

	ARRIVALS (Direct Shipping with Foreign Countries)				CLEARANCES (Direct Shipping with Foreign Countries)			
	1931		1930		1931		1930	
Country	No.	N.R.T.	No.	N.R.T.	No.	N.R.T.	No.	N.R.T.
Greek	95	84,923	93	97,895	36	38,653	53	57,113
British	24	46,103	24	46,307	13	22,314	25	39,473
American	2	6,710	3	10,413	2	6,710	1	3,700
French	16	42,412	11	33,068	12	33,770	10	32,400
German	9	13,234	11	13,728	3	4,127	6	15,190
Italian	81	170,301	79	180,744	81	181,045	73	170,008
Dutch	2	3,096	2	3,292	4	6,384	5	6,841
Roumanian	7	8,210	8	8,188	8	10,357	6	7,688
Others	46	61,235	46	44,600	29	53,365	20	25,664

The Port of New York

Latest Data issued by the Bureau of Commerce

Value of Foreign Trade at the Port of New York.

THE total value of foreign trade at the Port of New York during the month of July, 1931, amounted to $150,899,000, as compared with $198,153,000 for the corresponding month last year. While these figures show a decline of 24 per cent., a comparison with the value of the total foreign commerce at all United States ports shows that New York is holding its own, since it represented 43 per cent. of the country's total in July, 1931, as against 41 per cent. a year ago.

Exports amounted to $67,058,000 as compared with $98,039,000 in July, 1930, a decline of 31.6 per cent., and imports were $83,841,000 against $100,114,000 a year ago, a decline of 16 per cent.

	July		Net Change	
	1931 $	1930 $	Amount $	Per Cent.
Exports	67,058,000	98,039,000	—30,981,000	—31.6
Imports	83,841,000	100,114,000	—16,273,000	—16.3
Exports and Imports ...	150,899,000	198,153,000	—47,254,000	—23.8

Cargo Handling: A European Viewpoint.

When comparing the mechanical facilities for loading and unloading vessels in the Port of New York with those used at some of the larger European ports, the observer may be impressed by the array of large pier cranes at the latter. This fact has at times been the cause of unfavourable comment on the efficiency of the methods employed at not only New York but other American ports as well.

It is encouraging to note that the absence of pier cranes in America is not always criticised by Europeans. Herr Wundram, Director of Construction, Port of Hamburg, writing in the "Werft-Reederei-Hafen" on American Cargo Handling Equipment, has this to say: "It is universally accepted that the ports of the United States, although abundantly equipped for the handling by machinery of bulk cargoes, especially grain, are, as compared with European ports, lacking in mechanical devices for the loading and unloading of mixed cargoes. The pier crane, so generally employed in Europe, is rarely seen in the United States, the instances in which it is indispensable being of infrequent occurrence; and it is probable that the entire list of ports taken collectively possess fewer installations of this type than any single port of even the second class, omitting entirely the greater ports such as Hamburg, Antwerp, Rotterdam and London. This noteworthy absence of cranes in the land of unlimited possibilities must not, however, be lightly dismissed as due to unprogressiveness, or even with the comforting thought that Europe, with its favourite equipment, is more highly efficient. It was in the course of our travels a source of pleasure to investigate the primary causes and conditions serving as a basis for the allegedly antiquated American method of stevedoring, as well as to note the manner in which novel solutions of the problems inherent to the method were accepted without comment and wholly as a matter of course and unworthy of report."

As stated in the March, 1931, issue of the "Commerce Bulletin," the Port of New York is well equipped with freight handling facilities, and there are more mechanical devices on our piers than are apparent to the mere casual observer. As Herr Wundram so aptly states, American ingenuity is able to overcome problems incident to stevedoring without recourse to pier cranes.

Herr Wundram points out that most of our piers are equipped with cargo beams, which, used in conjunction with ship's booms and fast winches, are as efficient as pier cranes. The fast winches on American ships handle 31 to 33 tons of mixed cargo per gang-hour. Electric winches on German vessels handle only 22 to 27 tons per gang-hour.

The high average attained in cargo handling at American ports, Herr Wundram states, is due in part to the standard methods of packing goods. It is also due to the fact that the entire loading or unloading operation at American ports is performed by one agency, while at German ports the operation of stowage is performed by one stevedoring concern, the pier handling by another, etc.

Herr Wundram's views are highly complimentary to American methods of cargo handling, and he intimates that European ports may learn much in this respect from American practice.

Grain Exports.

The volume of grain, both domestic and Canadian, exported from the Port of New York during July, 1931, gained approximately 7 per cent. over that of the same period last year.

	July		Net Change	
	1931 (bushels)	1930 (bushels)	Amount	Per Cent.
Through the Port of New York—				
Domestic and Canadian Grain	5,498,000	5,147,000	+351,000	+6.8
Domestic Grain	486,000	837,000	—351,000	—41.9
Canadian Grain	5,012,000	4,310,000	+702,000	+16.3

Commerce at Port Newark.

A continued increase in receipts of lumber by vessel at Port Newark was registered during August, 1931, the amount received being 17,823,000 board feet as compared with 15,452,000 board feet in August, 1930, an increase of 15 per cent.

Inland shipments of lumber from Port Newark totalled 19,504,000 board feet, of which 5,352,000 board feet moved by railroad, and 14,152,000 board feet moved by truck.

Receipts by vessel of cargo other than lumber amounted to 30,875 tons, as compared with 24,297 tons in August, 1930, an increase of 27 per cent.

Fourteen steamers arrived at Port Newark during the month, as compared with 21 in August, 1930.

Steamship Passenger Traffic.

Although passenger traffic is approaching the peak of the season it is still well under the volume carried last year. Up to the end of July those lines operating between New York and foreign ports carried exactly 118,305 passengers less than they did during the same period in 1930. As pointed out in previous issues of the "Commerce Bulletin," much of this drop was due to drastic restrictions against admitting immigrant aliens, and which is well illustrated by the fact that only 15,751 of this class were brought in during the past 7 months of this year, compared with 77,797 in 1930 and 90,816 in 1929 in corresponding periods.

	July 1931	July 1930
INBOUND—		
Aliens—Immigrant	1,699	8,203
Non-Immigrant ...	7,563	10,557
U.S. Citizens	22,442	30,189
Total ...	31,704	48,949
OUTBOUND—		
Aliens—Emigrant	4,284	3,125
Non-Emigrant	15,357	16,649
U.S. Citizens	34,639	39,426
Total ...	54,280	59,200
Total—Inbound and Outbound ...	85,984	108,149
Total for 7 months	422,433	540,738

Vessel Movements in Foreign Trade.

The number of entrances and clearances of vessels in foreign trade at the Port of New York continues to be less than last year.

	August, 1931		August, 1930	
	No. of Vessels	Vessel Tonnage	No. of Vessels	Vessel Tonnage
Entrances ...	541	2,786,153	554	2,716,668
Clearances ...	531	2,739,919	586	2,855,323

New York State Barge Canal.

Since the opening of navigation, a number of the principal commodities have moved through the canal in larger volume than did during the same period last season. Wheat, which comprises the largest tonnage of any one item, registered 722,227 tons so far this year, which is slightly under the 751,326 tons carried in last year's period. Petroleum tonnage, however, totals 539,530 tons so far this season, as against 472,777 tons for the same period in 1930.

Other commodities that are ahead of the corresponding 1930 period are as follows:—

	1931 Tons	1930 Tons
Sugar	195,221	87,691
Barley	75,262	2,456
Flour	20,722	—
Iron and Steel Articles	126,199	87,039

Pig-iron dropped from 85,428 tons in the 1930 period to 49,549 tons carried this year.

Steamship Sailings.

A comparison of the total number of vessels sailing from the Port of New York during the month of August with the same period last year indicates a decline of slightly over 8 per cent. Direct sailings to foreign ports are down about 12 per cent., which confirms the impression that those lines in foreign service are suffering more than those plying domestic routes. The 19 special cruises to foreign ports, in August, however, are well ahead of that month in 1930, when only 7 were recorded.

The peak sailing day of the month was Saturday, August 8th. On this day a total of 91 vessels left the port, of which no less than 48 were in foreign service and included among other direct sailings: 7 to the United Kingdom, 8 to North European ports, 13 to Caribbean-Mexican ports, 5 to the east coast of South America, 4 cruises to Canadian and West Indian waters, and 1 tanker. The 43 domestic sailings also included 3 direct to the Pacific Coast, 8 to South Atlantic and Gulf ports, 2 coastwise tankers and 4 coal carriers.

The Vickers-Nash Safe Load Indicators for Cranes.

The ever-present danger of overloading with cranes has latterly been given careful consideration by Messrs. Vickers-Armstrongs, Ltd., and the result is that they have now placed on the market a new device which indicates to the crane driver whether the object he is lifting is beyond the capacity of the crane or not.

The Principles of the Vickers-Nash Indicator.

The load is weighed against a spring reaction; the resistance of this spring in turn is varied by the angle of the jib. It cannot vary in " direct " proportion, since the safe loads do not vary in " direct " proportion; accordingly the mechanism has to take into account the crane makers' permissible loads at the varying jib radius. The indicator is of an extremely robust and " fool-proof " nature, and yet such as to give accurate readings.

The Jib Head Device.—An eccentric sleeve is interposed between the jib head pulley and jib head spindle, and is set in such a position that the weight on the bond rope tends to turn the eccentric. Fixed to the eccentric is a tension arm which is connected to a spring inside the indicator case by a rod which is led down the jib through one or more roller guides. The jib head pulley is carried upon an eccentric, which in turn is mounted upon the jib head spindle, ball or roller anti-friction bearings being used.

The Indicator.—To the indicator are taken two rods, the upper tension rod from the jib head eccentric and the lower rod pivoted to the base of the crane. These actuate the indicator as follows:—The tension rod passes through the compression spring in the case, so that the spring is compressed by any weight on the bond; this compression spring does not abut against a fixed point, but against a trunnion carried upon a rocker. Movement of this rocker, therefore, has the effect of varying the stress in the spring.

The lower rod is connected to a cam which is pivoted within the case; this cam is so cut that its profile gives the correct relationship of safe load to jib radius as established by the manufacturer of the crane. As the jib is raised, this cam moves on its pivot, the rocker is tilted, and the stress in the compression spring increased, so that a heavier load is needed to bring the pointer to the danger point. Conversely, lowering the jib moves the cam in the opposite direction, the rocker lessens the stress in the compression spring, which thereby becomes more sensitive to the lighter load permitted at the longer radius, so that a lighter load can bring the pointer to the danger mark. Thus the whole action is entirely automatic, and the margin of safety or approach of danger is correctly indicated in accordance with the ratings established for the particular crane.

The Danger Warning.—The indicator can be arranged in several forms. The one normally supplied consists of a plain pointer and a scale. The " safety " portion of the scale is painted green; the " maximum " mark is white and the " danger " portion is painted red. Means are provided by a pointed mechanism operating an electrical or mechanical alarm bell. In addition to the indicator, a sealed " tell-tale " is fitted so that, in the event of an accident, it can be ascertained whether or no the crane has been overloaded at any time, and if so, to what extent.

Advantages of the Indicator.—The indicator obviously assists in avoiding damage or accident through overloading, and it also allows economy in working, since the crane can be safely used to its full capacity. Time can be saved, particularly in cases where it is necessary for the crane to " take the weight " in order to enable a mason or fitter to move a stone or girder into place. In such cases the driver can see by the movement of the pointer when he has " taken the weight " without having actually lifted the article.

Vickers-Armstrongs have obtained the sole manufacturing and selling rights of the indicator for Great Britain and Northern Ireland, and it is being produced at their Dartford Works.

Increased Grain Handling Facilities at Swansea.

Messrs. Weaver and Co., Ltd., the well-known flour millers and grain merchants, of Swansea, have placed an order with Messrs. Henry Simon, Ltd., Cheadle Heath, near Manchester, for a travelling pneumatic grain discharging plant, which is to be installed on the quay alongside Messrs. Weaver's warehouses at Swansea Docks. The plant, which will be capable of discharging grain at a maximum rate of 180 tons per hour, will be mounted on a travelling steel-braced tower fitted with traversing gear for moving the plant along the quay.

Steamers lying in the North Dock basin will be discharged by the pneumatic plant, and the grain delivered direct to existing band conveyors arranged in tunnels below the quay for transfer to Messrs. Weaver's warehouses or flour mills.

The pneumatic equipment will include " Simon " standard reciprocating vacuum pumps, electrically driven, and pipe booms fitted with the latest improvements to facilitate rapid handling and manipulation. There will also be a 2-ton " Reform " automatic grain weighing machine. Special provision will be made on the plant for the collection of dust.

The work of grain discharging is at present carried out by a floating pneumatic plant supplied by Messrs. Henry Simon, Ltd., some years ago, with a capacity of 120 tons per hour. The new plant will add very materially to Messrs. Weaver's grain handling facilities.

Kiel Canal Traffic in September.

There was a decline of 10.88 per cent. in the number of vessels and of 4.79 per cent. in the total tonnage capacity of shipping passing through the canal in September compared with the preceding month. This decline may be regarded as seasonal, although compared with the corresponding month of 1930 there is a big fall in the return. The actual figures are as follows: September, 1931, 4,324 vessels, 1,701,457 net registered tons; August, 1931, 4,852 vessels, 1,787,024 net registered tons; September, 1930, 4,929 vessels, 1,950,046 net registered tons.

FOR SALE

NON-PROPELLING SUCTION DREDGER

Now lying at Bathurst, Gambia. Built by Messrs. Fleming & Ferguson, in 1925. Plant includes 12-inch sand pump, pontoon and pipe-line, etc.

Full particulars obtainable from :

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Quoting O/Prod. 0695.

In September of this year steam and motor vessels represented 90.63 per cent. of the total tonnage capacity, and loaded vessels 75.07 per cent. In the direction Brunsbuttelkoog-Holtenau (i.e., to the Baltic) the traffic figures were 2,136 vessels, aggregating 816,687 net registered tons, while the number of vessels sailing in the opposite direction was 2,188 vessels, aggregating 884,770 net registered tons.

The average dead-weight capacity of all vessels using the canal in September was 393 net registered tons.

Of the total of 4,324 vessels in September, 1,954 were registered sea-going steamers aggregating 1,489,565 net registered tons, of which 1,859 were freight and passenger vessels of 1,486,681 net registered tons, 93 were steam tugs of 2,810 net registered tons, and 2 were fishing steamers of 74 net registered tons. Further, 2,136 sailing vessels aggregating 118,578 net registered tons, 103 lighters and barges of 40,603 net registered tons, and 131 pleasure and Government vessels of 52,711 net registered tons.

Shipping Traffic at Berne.

According to the Basle Cantonal Shipping Board the total volume of goods handled in the Basle Harbour during September amounted to 155,223 tons, three times as much as in the corresponding month of last year. The following figures show the amount of traffic up and down stream on the Rhine and on the " Canal d'Alsace " during September:—

Rhine, upstream, 59,100 tons; canal, up-stream, 90,642 tons; Rhine, down-stream, 5,266 tons; canal, down-stream, 215 tons; total, 155,223 tons.

This includes 445 barges in ballast, 558 laden barges and 8 motor barges.

Among the goods carried up stream were coal, coke, cereals and other foodstuffs, liquid fuel, chemical raw materials, iron and metals, bitumen, etc., whilst those shipped down stream included cement and chemical products, waste goods, stones, etc.

Shipping returns on the Rhine and on the " Canal d'Alsace " for the first nine months of 1931, as compared with the corresponding period of 1930, are given in the following table:—

	1930 (First Nine Months) Tons	1931 (First Nine Months) Tons
Total Traffic	836,640	1,026,300
Rhine	365,830	337,728
Canal	470,810	688,572
Total Traffic Up-Stream ...	764,741	964,462
Total Traffic Down-Stream	71,899	61,838

In view of the present economic depression, this development in traffic is considered highly satisfactory; furthermore, during the first three quarters of the year, more than one million tons were handled, whereas it was not until November last year that the million-ton mark was touched.